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# Second Five-Year Review Report
# For
# Carson River Mercury Site
# Lyon County, Nevada

Prepared by: US Army Corps of Engineers, Seattle District
Seattle, Washington

Prepared for: US Environmental Protection Agency, Region 9
San Francisco, California

July 31, 2008

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# Five-Year Review Report

Second Five-Year Review Report
For
Carson River Mercury Site
Cities of Dayton and Silver City
Lyon County, Nevada

July 31, 2008

*PREPARED BY:*

United States Army Corps of Engineers (USACE)
Seattle District
Seattle, Washington

*PREPARED FOR:*

United Stated Environmental Protection Agency (USEPA)
Region 9
San Francisco, California

Approved by: Date:

_____ _____

Kathleen Salyer
Chief, Site Clean-up Branch, Superfund Division
USEPA, Region 9

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# Table of Contents

# Table of Contents, Continued

## Tables *(located within body of text)*



## Figures *(located after end of text)*



## Attachments *(located after end of text)*

# Acronyms and Abbreviations

| | |
|---|---|
| ARAR | Applicable or Relevant and Appropriate Requirement |
| BCA | (NDEP) Bureau of Corrective Actions |
| CC&Rs | Covenants, Conditions and Restrictions |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| CRMS | Carson River Mercury Site |
| cy | Cubic yards |
| DNM | Durable Notification Mechanism |
| EC | Environmental Covenant |
| EPA | Environmental Protection Agency |
| FYR | Five Year Review |
| IAG | Interagency Agreement |
| IC | Institutional Control |
| LTSRP | Long-Term Sampling and Response Plan |
| mg/kg | Milligrams per kilogram |
| NCP | National Oil and Hazardous Substances Pollution Contingency Plan |
| NDEP | Nevada Division of Environmental Protection |
| NPL | National Priority List |
| OSWER | Office of Solid Waste and Emergency Response |
| OU | Operable Unit |
| PDT | Project Delivery Team |
| RA | Remedial Action |
| RAO | Remedial Action Objective |
| RCRA | Resource Conservation and Recovery Act |
| RI/FS | Remedial Investigation/Feasibility Study |
| ROD | Record of Decision |
| RPM | Remedial Project Manager |
| SAP | Sampling and Analysis Plan |
| SARA | Superfund Amendments and Reauthorization Act |
| TBC | To Be Considered |
| TCLP | Toxicity Characteristic Leaching Procedure |
| US | United States |
| USACE | United States Army Corps of Engineers |
| USEPA | United States Environmental Protection Agency |
| USFWS | United States Fish and Wildlife Service |
| USGS | United States Geological Survey |

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## Executive Summary

The Carson River Mercury Site (CRMS) is located east of Carson City, Nevada and includes more than 50 miles of contaminated river, reservoir, and wetland sediments in the middle and lower portions of the Carson River system, and more than 50 mill sites, their associated tailings piles, and subsequent uplands dispersement of contaminated soils where mercury was used to process gold and silver ore mined in the latter part of the 19th century as part of the "Comstock Lode." Operable Unit (OU) 1 contains the upland soils mercury contamination while OU2 refers to the mercury contamination associated within and downstream of the Carson River system. Complete characterization and remedy selection for OU2 has not been completed to date; hence this five-year review focuses on OU1.

The stated remedy for OU1, the upland soils portion of the CRMS, was surface soil removal and/or capping of four areas along with implementation of Institutional Controls (ICs) to keep from disturbing subsurface soils, and ICs via a Long-Term Sampling and Response Plan to address as yet uncharacterized portions of the Site which may undergo residential or commercial development in the future. The remediated areas achieved construction completion in Dec 1999. The trigger for this second five-year review was the completion of the first five-year review in Sep 2003.

The assessment of this five-year review found that the active remedy of soil removal and replacement with clean fill in four areas of the Site for OU1 was constructed in accordance with the requirements of the Record of Decision; however, Institutional Controls (ICs) associated with the remediated areas, as well as ICs associated with un-remediated areas, are not adequate at this time. Therefore, the Site is not protective of human health and the environment at this time…[make this consistent with Section X and EPA's Protectiveness Statement]

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Five-Year Review Summary Form

## *SITE IDENTIFICATION*

**Site name *(from WasteLAN)*:** Carson River Mercury Site

**EPA ID *(from WasteLAN)*:** NVD980813646

| **Region:** 9 | **State:** NV | **City/County:** Dayton and Silver City, Lyon County |
|---|---|---|

## *SITE STATUS*

**NPL status:** ☒ Final ☐ Deleted ☐ Other (specify)

**Remediation status** (choose all that apply): ☐ Under Construction ☐ Operating ☒ Complete

| **Multiple OUs?*** ☒ YES ☐ NO | **Construction completion date:** ___ / ___ / _____ |
|---|---|

**Has site been put into reuse?** ☒ YES ☐ NO

## *REVIEW STATUS*

**Lead agency:** ☒ EPA ☐ State ☐ Tribe ☐ Other Federal Agency _____

**Author name:** Jere Johnson

| **Author title:** Remedial Project Manager | **Author affiliation:** EPA Region 9 |
|---|---|

**Review period:**** 9/30/2003 to 9/30/2008

**Date(s) of site inspection:** 3/3-6/2008

**Type of review:**

☒ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only
☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead
☐ Regional Discretion

**Review number:** ☐ 1 (first) ☒ 2 (second) ☐ 3 (third) ☐ Other (specify) _____

**Triggering action:**

☐ Actual RA Onsite Construction at OU #____ ☐ Actual RA Start at OU#____
☐ Construction Completion ☒ Previous Five-Year Review Report
☐ Other (specify)

**Triggering action date *(from WasteLAN)*:** 9/30/2003

**Due date *(five years after triggering action date)*:** 9/30/2008

* ["OU" refers to operable unit.]
**[Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

## Five-Year Review Summary Form, cont'd.

**Issues:**

*The following list contains the significant issues brought forward during this FYR, all of which pertain to Site ICs:*
1. Finalization of the LTSRP is necessary.
2. In the previously remediated areas, a mechanism needs to be put in place to either sample for and document the subsurface soil (greater than 2 ft depth) contains sufficiently low levels of mercury OR ensure subsurface soil is not being disturbed.
3. DNMs are not being consistently recorded for newly developed areas within the CRMS of Lyon County, as per LTSRP requirements.
4. There is no current mechanism for protectiveness evaluation for developments of five units or less.

**Recommendations and Follow-up Actions:**

1. Finalize LTSRP.
2. Ensure residents of remediated properties are not exposing subsurface soil; or conduct subsurface sampling to confirm elimination of risk.
3. Development of more effective process to be defined in final LTSRP to record DNMs with Lyon County when required.
4. Create mechanism to identify potential small-scale (less than five units/ five acres) developments within the CRMS, to be defined in final LTSRP.

**Protectiveness Statement(s):**

*[Not Protective. Statement to be drafted by EPA Region 9; should be same or similar wording as in Section X for consistency.]*

**Other Comments:**

*None.*

Carson River Mercury Site
Dayton and Silver City, Nevada
Second Five-Year Review Report

# I. Introduction

This is the second Five-Year Review report of Remedial Actions for the Carson River Mercury Site located in Lyon County, Nevada. The first Five-Year Review report completed in 2003 was the triggering action for this review. The Site has previously been divided into two operable units (OUs); 1) the uplands soil OU1 and 2) the waters and sediment associated with the Carson River (OU2). This five-year review addresses the completed OU1 remedy. OU2 remains in the Remedial Investigation/Feasibility Study (RI/FS) stage of completion.

The purpose of a Five-Year Review (FYR) report is to determine whether the remedy at a Superfund site continues to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in the FYR reports. In addition, FYR reports identify issues found during the review, if any, and identify recommendations to address those issues.

The United States Environmental Protection Agency (EPA) is preparing this FYR report pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §121 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA §121(c) states:

> *If the President Selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such a review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The EPA interpreted this requirement further in the NCP; 40 Code of Federal Regulations (CFR) §300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after initiation of the selected remedial action.*

The purpose and focus of FYRs are further defined in EPA Office of Solid Waste and Emergency Response (OSWER) Directive 9355.7-03B-P (EPA 2001).

This review was conducted by the USEPA Region 9 with technical assistance provided by the U.S. Army Corps of Engineers (USACE), Seattle District, between Nov 2007 and Sep 2008. The Seattle District USACE project delivery team (PDT) prepared this FYR through an Interagency Agreement (IAG) between EPA Headquarters and USACE.

This second FYR report is a statutory review, following five years after the completion of the first FYR report signed Sep 30, 2003. This statutory review is required because the remedial action occurred after the Superfund Amendments Reauthorization Act (SARA) and resulted in hazardous substances being left on site above levels that allow for unlimited use and unrestricted exposure. The first FYR report was triggered by the presence of hazardous substances, pollutants, or contaminants on site above levels that allow for unlimited use and unrestricted exposure.

## II. Site Chronology

The following table summarizes, in chronological order, the major milestones or notable events for the Carson River Mercury Site.

**Table 1 – Chronology of Site Events**

| Event | Date |
|---|---|
| Discharge of mercury-contaminated mill tailings to the environment | Mid to Late 1800s |
| Initial discovery of elevated levels of mercury in the Carson River | Early 1970s |
| NPL listing (final) | Aug 1990 |
| Removal actions | 1990, 1992 |
| Human Health Risk Assessment and Remedial Investigation Report | Dec 1994 |
| Feasibility Study | Dec 1994 |
| ROD signature | Mar 1995 |
| Remedial design start | Apr 1995 |
| Remedial design complete | Sep 1996 |
| Remedial action start | Sep 1993 |
| Superfund State Contract | Jul 1997 |
| Remedial Action construction dates | Aug 1998 – Jan 1999<br>Aug – Dec 1999 |
| First Five-Year Review Report completed | Sep 2003 |
| Draft Long-Term Sampling and Response Plan (LTSRP) developed | Jan 2005 |
| NDEP finalizes brochure describing development permitting requirements in the Carson River area | Apr 2008 |

## III. Background

The Carson River Mercury Site (CRMS) is located east of Carson City, Nevada and includes more than 50 miles of contaminated river, reservoir, and wetland sediments in the middle and lower portions of the Carson River system, and more than 50 mill sites where mercury was used to process gold and silver ore mined from the "Comstock Lode." The vicinity of the CRMS is shown in Figure 1.

Mining in the Carson River drainage basin commenced in 1850 when placer gold deposits were discovered near Dayton at the mouth of Gold Canyon. Throughout the 1850s, mining consisted of working placer deposits for gold in Gold Canyon and Sixmile Canyon. These ore deposits became known as the Comstock Lode. The initial ore discovered was extremely rich in gold and silver, gold was more abundant in Gold Canyon while silver was more abundant in Sixmile Canyon. The general milling process employed before 1900 involved pulverizing ore with stamp mills, creating a slurry, and adding mercury to the mixture. The mercury formed an amalgam with the precious metals which was then separated from the solution and retorted.

A U.S. Geological Survey (USGS) study first documented elevated levels of mercury in sediment and surface water in the Carson River system in the early 1970s. Subsequent studies further delineated the extent of mercury contamination at historical mill sites, in river and lake sediment, in the adjacent floodplain, and in fish and wildlife. The CRMS was added to the National Priorities List (NPL) in Aug 1990. State advisories recommend limited or no consumption of fish and ducks at the Site due to high levels of mercury.

EPA has identified two operable units at the Site. Operable Unit (OU) 1, the subject of this five year review, addresses risks posed by the contaminated upland soils including those associated with drainages from former mine and mill sites as well as the floodplain of the Carson River downstream of the drainages. OU2, which is in the Remedial Investigation/Feasibility Study (RI/FS) stage, addresses mercury contamination in the Carson River system, which includes contaminated surface waters and sediments in the Carson River, Lahontan Reservoir, Carson Lake, and Stillwater National Wildlife Refuge.

Since 1992, considerable study has occurred regarding ecological effects of mercury in the Lahontan Reservoir and affected upstream portions of the Carson River (OU2), their sediments, and fish and fish-eating birds within those water bodies. The ecological risk assessment for the CRMS OU2 has been more extensive than for typical Superfund sites due mainly to the lack of any simple or inexpensive cleanup options for the contaminated sediments**.** OU2 investigations are expected to continue through at least 2009. After the studies are complete, EPA will evaluate the costs and benefits of

cleaning up mercury contamination in the river, reservoir, and wetlands and determine what type of cleanup, if any, is warranted.

The Carson River drainage basin drains approximately 3,980 square miles in east-central California and west- central Nevada. The Carson River forms in the eastern Sierra Nevada Mountains south of Lake Tahoe and generally flows northeastward and eastward to the Carson Sink, a large depressional feature in the Carson Desert with no surficial fluvial outlet. The Carson River flows through a series of generally separate alluvial valleys from the headwaters area to the Carson Sink. In downstream order, the alluvial valleys passed by the river include Carson Valley, Eagle Valley, Dayton Plains, Stagecoach Valley, Churchill Valley, and Carson Desert. Between New Empire and Dayton the river flows through a narrow, high-gradient stretch along which large ore-processing mills were situated during the late 1800s. The flow of the river is interrupted west of Fallon by Lahontan Reservoir, which was constructed in 1915 as part of the Newlands Irrigation Project. Below Lahontan Dam, flow is routed through a complex network of ditches, drains, and canals of the Newlands Irrigation Project. Irrigation return flow eventually discharges to Carson Lake, the Stillwater Wildlife Refuge, and/ or the Carson Sink.

Stream flow in the Carson River above Lahontan Reservoir is highly seasonal. The major source of water for the Carson River is the winter snow pack in the Sierra Nevada Mountains. Base flow is reached in late summer (Aug, Sep, and Oct) and flow then increases slightly through the fall and winter (Nov through Mar), until the snow melt season starts in early spring. Maximum annual flow typically occurs in Apr, May and Jun.

The areal extent of water bodies and wetlands in the Carson Basin is highly variable, both seasonally and from year to year. This is especially true in the Carson Desert. For example, between Jul 1984 and Feb 1985, following three unusually wet years, the water surface area of the Carson Sink was approximately 200,000 acres, yet by Apr 1988 (during a second consecutive drought year) the sink was dry.

*Land and Resource Use*

Historical land use in the Carson River basin was mostly agriculture and mining in the 1840s and 1850s. The mining industry and population in the basin fell rapidly in the 1880s; however, railroad access to other markets helped promote ranching and farming. Another change in land use was an increase in irrigated acreage in the Carson Desert prompted by the impoundment of Lahontan Reservoir in 1915 and the creation of the Newlands Irrigation Project. Alfalfa was the principal irrigated crop, in terms of acreage and revenue, in the Newlands Irrigation Project. The estimated irrigated acreage ranged from 61,000 to 67,000 acres for the Newlands Project during 1980-1987. Dayton and Churchill Valleys, which have the smallest populations in the Nevada portion of the Carson basin, are primarily rangeland, with agricultural areas along the Carson River. Land use and population remained relatively unchanged in the Carson

River basin from 1890 until 1950, until the advent and implementation of suburban development. Since 1950, Carson City, Fallon, and rural populations have grown considerably with most of the urban and suburban development occurring on land that was previously used for agriculture (either irrigated cropland or rangeland). Presently, the local economy and urban land use are dominated by the retail trade and service sectors, primarily casinos and adjunct businesses such as hotels, motels, and restaurants that cater to tourists. Areas surrounding the CRMS are expected to continue to experience high residential growth over the next several decades

## IV. Remedial Actions

*Remedy Selection*

The selected remedy for OU1 includes the following components:

- excavation of contaminated soils exceeding 80 milligrams per kilogram (mg/kg) mercury in a limited number of residential areas in Dayton and Silver City, Nevada, off site disposal of excavated soil, and backfilling with clean soil (or placement of up to two feet of clean soil on top of the contaminated soil in lieu of excavation and backfilling);

- disposal of soils that do not exceed Toxicity Characteristic Leaching Potential (TCLP) standards at a Resource Conservation and Recovery Act (RCRA) municipal landfill;

- disposal of any soils that exceed TCLP standards at a RCRA municipal landfill after treatment, or at a RCRA hazardous waste landfill;

- restoration and landscaping after excavation and backfilling; and

- implementation of institutional controls to ensure that residential development in areas known or suspected to be impacted by mercury, including characterization of mercury levels in surface soils and, if necessary, remediation of impacted soils. These institutional controls will be referred to as the "Long-term Sampling and Response Plan."

*Remedy Implementation*

The four areas of concern where remediation occurred are residential properties designated MS001, MS002, MS004, and MS030. These four areas were remediated as described in the previous section between Aug 1998 and Dec 1999. Their locations, shown in Figure 2 for MS001, MS002 and MS004, and Figure 3 for MS030, are as follows:

*MS001.* This area, located in Dayton, Nevada, is bounded by Main Street/Dayton Valley Road to the north, Railroad Avenue to the west, the Carson River to the east, and Pradere Road to the south. The approximate size of the remediated area was 92,344 $ft^2$.

*MS002.* Located in Dayton, this area is within a mobile home park on the west side of Highway 50, east of Ziller Way. The approximate size of the remediated area was 988 $ft^2$.

*MS004.* The third area in Dayton, this area lies along River Street between Silver Street to the north and the Highway 50/River Street junction to the south. The approximate size of the remediated area was 36,603 $ft^2$.

*MS030.* Located in Silver City, this area is located west of Highway 342, along American Flat Road. The approximate size of the remediated area was 4,416 $ft^2$.

To address mercury-related risks in areas where residential development is planned, the Nevada Division of Environmental Protection (NDEP) has instituted a review process for proposed subdivisions consisting of five or more units. The process is for the NDEP Bureau of Water Pollution Control to request that NDEP's Bureau of Corrective Actions (BCA) review a proposed subdivision for mercury-related risks, and require sampling and/or mitigation requirements when NDEP BCA determines the proposed development is within the limits of the CRMS. The review generally includes a comparison of the location of the proposed subdivision to EPA and University of Nevada studies identifying areas where elevated levels of mercury are likely, and consultation with developers, property owners, and their consultants. Subdivision plans ("tentative maps") require review and approval of their sewerage plans from NDEP's Bureau of Water Pollution Control. EPA has provided assistance to NDEP and affected property owners and developers when requested.

*System Operations, Maintenance, and Monitoring*

No operations, maintenance or monitoring was required as part of the remedy.

## V. Progress Since the Last Five-Year Review

Some progress on the implementation of ICs for the Site has been made since Sep 2003, the date of the last five-year review. No additional remedial actions have been undertaken since Dec 1999, when MS001, MS002, MS004, and MS030 were completed.

As the EPA-designated lead concerning ICs for this project, Nevada Division of Environmental Protection (NDEP) has continued to update the ICs and LTSRP. As part of this effort NDEP has continued to track new or proposed construction/developments within the potential boundaries of the CRMS. Any new residential developments which

contain at least five units, or any commercial developments greater than five acres, either within the 100-year flood plain of the Carson River, or on/near former mining or mill sites and associated tailings piles, or within drainages of Gold Canyon, Sixmile Canyon, or Sevenmile Canyon, must submit a Sampling and Analysis Plan to NDEP Bureau of Corrective Actions (BCA) for approval as stated in the LTSRP. The LTSRP serves as the institutional controls by providing specific sampling guidelines to assess mercury levels in surface soils, interpreting and reporting sampling results, and specific remediation guidelines for addressing impacted areas and for follow-up sampling and reporting (LTSRP, 2007). Any proposed development that submits plans to the NDEP Bureau of Water Pollution Control to obtain a storm water discharge permit is forwarded to the NDEP BCA so that an evaluation of whether the proposed development falls within the CRMS is made.

Between 2003 and 2008 (the period of this FYR), NDEP reviewed approximately 23 development proposals and required analyses of soil samples for mercury at about 13 developments. None of the developments sampled required mitigation. For comparison, between 1995 and 2003, NDEP reviewed more than 20 development proposals, required analyses of soil samples for mercury at approximately 12 developments, and worked with the developer on mitigation at approximately two developments.

NDEP BCA has also worked with Lyon County to develop a brochure which helps explain the CRMS to property owners seeking a county building permit, as well as concerned members of the public. The design of the brochure had been done specifically to balance awareness and education without causing undue public alarm. This brochure was approved for publication at a Lyon County meeting in early 2008. See Attachment 5 for the CRMS brochure.

In addition to the above, the following table lists recommendations and follow-up actions to issues presented during the first five-year review.

**Table 2 – Site Progress Summary**

| Issue from previous FYR | Recommendation | Action Taken |
|---|---|---|
| MS001 – Flood protection | Monitor Carson River for major flooding and erosion | In 2006 there was a 10,700 cubic feet per second peak flow flood in Dayton and resulting erosion is assumed; however, close inspection of MS001 was not possible during this FYR |
| Future construction activities in remediated areas | Inspect during next review | No construction evident except scraping of land surface on/near MS004 on Silver St. |
| Future development in areas with elevated levels of | Continue efforts of NDEP BCA review process | Effort continues; as reported above |

| Issue from previous FYR | Recommendation | Action Taken |
|---|---|---|
| mercury | | |

# VI. Five-Year Review Process

*Administrative Components*

The team lead for the Carson River Mercury Site Five-Year Review was Jere Johnson, the EPA Remedial Project Manager (RPM), Region 9. The review team included personnel from the USACE, Seattle District. Sheri Moore, Marlowe Laubach, and Jefferey Powers, all with the USACE, Seattle District, assisted with the review as representatives of the support agency. By Nov 2007, the review team had been formed, and had established the review schedule and its major components including:

- Document Collection and Review;
- Data Assessment/Analysis;
- Site Inspection;
- Interviews and Community Notification and Involvement
- Five-Year Review Report Development and Review.

The FYR has a statutory completion date of Sep 30, 2008.

*Community Notification and Involvement*

EPA to complete this section.

*Document Review*

A review of reports pertinent to this Five-Year Review was conducted by the review team. The types of documents reviewed included reports concerning the Remedial Investigation, Human Health Risk Assessment, Feasibility Study, Record of Decision, First Five-Year Review, Institutional Control documents including the CRMS brochure, LTSRP, and NDEP proposed developments data tracking sheet, as well as other supporting materials. Attachment 1 is a complete list of documents reviewed during this Five-Year Review.

*Data Review and Evaluation*

The only analytical data generated since the last five-year review has been by developers proposing large-scale residential or commercial developments (in excess of five units or five acres for residential and commercial ventures, respectively). NDEP BCA has recommended sampling protocols based on the latest LTSRP and has kept track of the results in a spreadsheet-type database. This database keeps track of development or project name, the criteria/criterion for which the project is considered within the CRMS, total acreage and subdivision lots, pre-final-grade sampling details, finished-grade sampling details, and if necessary post-remediation and confirmation sampling details.

Individual analytical results for each sample location have not been incorporated into the database. Instead, NDEP summarizes the total number of mercury soil samples and the maximum concentrations. If a development is proposed which falls within the areas considered to have a high potential for mercury contamination (within the CRMS), the developer must develop a NDEP-approved Sampling and Analysis Plan (SAP) and execute pre-final-grade surface soil sampling (defined in the LTSRP as the uppermost two feet) to determine if unacceptable mercury levels exist in soil. If the mercury levels are above the site-specific action level of 80 mg/kg for residential-zoned property or 300 mg/kg for commercial-zoned property, the developer must remediate the development site by either capping with two feet of clean fill, or excavation to two feet and capping with clean fill. Then the developer must collect and analyze final-grade surface soil samples for mercury to ensure the final-grade soil is of acceptable chemical quality. The process is to be repeated until the final-grade surface soil mercury samples are within acceptable limits.

*ARARS Review*

Applicable or Relevant and Appropriate Requirements (ARARs) are defined as standards or requirements that are found to be either “applicable” or “relevant and appropriate” to the conditions and circumstances found at a particular site. In addition to legally binding laws and regulations which may make up the ARARs list, EPA or the State may identify other non-promulgated advisories, criteria or guidance as “To Be Considered” requirements (TBCs) if no ARAR addresses a particular situation or ensures protectiveness.

Many applicable or relevant and appropriate requirements (ARARs) were pertinent only with respect to the active remedial actions which were completed by Dec 1999. For example, the *Nevada Bureau of Mining Regulation and Reclamation Guidance Document for Alternate Use of Mine Waste Solids-Disposal Outside of Containment* guidance document was a chemical- and action-specific ARAR which prohibited placement mine wastes (i.e. potential remedial action excavation material) in an unmanaged disposal facility without proper testing.

The risk-based cleanup levels for mercury of 80 mg/kg for residential and 300 mg/kg commercial as determined by the HHRA (USEPA, 1994) applies to the CRMS as an

enforceable requirement. Because the *Nevada Contaminated Soil and Groundwater Remediation Policy*, although not promulgated, contained soil cleanup standards deemed TBC, and because EPA determined an absence of other promulgated standards, the cleanup standards in this State policy were to apply to the CRMS. The policy states that site-specific cleanup levels may be used in place of those set forth in the policy if the site-specific levels are developed in accordance with a scientifically valid risk assessment; hence the site-specific 80 and 300 mg/kg cleanup levels are used. See Attachment 2 for a summary table of ARARS identified in the ROD for this Site.

*Site Inspection*

A site visit and inspection was conducted Mar 3-6, 2008 to gather information about the Site's status. This trip included a meeting with personnel at the NDEP BCA in Carson City and ICs research at the Lyon County Recorders Office in Yerington on Mar 4th, a meeting with the Lyon County Building Manager at their satellite office in Dayton and the formal site inspection of remediated sites MS001, MS002, MS004, and MS030 in Dayton and Silver City, as well as a visit on Mar 5th to one of the development projects currently under construction. The review team visually inspected and documented the conditions of the Site, the remediated areas, and the surrounding area for inclusion into the second five-year review. Representatives of the USACE and NDEP were present for the site inspection. For additional details regarding the site inspection and findings, including photographs of select features and a roster of attendees, see the Site Inspection Trip Report (Attachment 3) and Site Inspection Checklist (Attachment 4).

Observations during the site inspection indicated that generally the implemented remedial actions at the three locations in Dayton and one in Silver City remain protective because no obvious disturbance to soils was noted. The lone exception was at the MS004 site south of Silver Street in Dayton. At the Silver Street MS004 location, scraping of the land surface by a front end loader or equivalent was evident, as there were somewhat recent piles of soil mounded besides flat parking areas at this location. See Attachment 4 for a discussion of implications of this finding.

*Interviews*

As part of the site visit and inspection process, three informal interviews were conducted. The first two interviewees were both from the NDEP Bureau of Corrective Actions: Mr. Jeryl Gardner, Environmental Scientist, and Mr. Samuel Jackson, Supervisor – Superfund Branch. These individuals provided a great deal of site history and perspective as well as updated information on the Site's ICs status. Mr. Nick Malarchik, Department Director of the Lyon County Building Department, was also informally interviewed over the course of a meeting between the five-year review team, the aforementioned parties with NDEP, and Mr. Malarchik. Mr. Malarchik provided valuable insight into the county's perspective of the CRMS as well as insight into some of the concerns of Lyon County residents. No formal interviews were conducted as part

of the second five-year review; however, please refer to Attachment 4 for incorporation of informal interview details.

## VII. Technical Assessment

*Question A: Is the remedy functioning as intended by the decision documents?*

Answer: The excavation and fill work associated with all but one portion of one remediated area (exception discussed below) appears intact and undisturbed, and effective in preventing direct contact with mercury-contaminated soils. However, there are aspects of the remedy which are not functioning as intended by the Record of Decision. The major components of the Site remedy included 1) remedial action (e.g. excavation and backfill with clean fill) of four former mill site areas, and 2) the development and implementation of Institutional Controls to prevent exposure to potential, unacceptably high levels of mercury in newly developed areas within the CRMS. Subsections A.1 and A.6 address functionality concerns for the remedial actions and ICs, respectively.

A.1 Remedial Action Performance and Monitoring Results:
After soil removal and clean fill replacement was completed, the remediated areas were either reseeded with native vegetation above new topsoil (MS001, MS004, MS030) or sodded (MS002, portions of MS004). A temporary irrigation system was put in place at MS0001 to aid in establishing vegetation and permanent irrigation systems were replaced in kind for portions of MS004. There was no performance or monitoring requirements beyond these initial efforts to reestablish vegetation. As such, there is currently no effective way to monitor for breaching of the clean surficial soil which might result in potential exposure to subsurface soils with mercury above the 80 mg/kg cleanup level (which was not originally sampled) other than once every five years during the FYR site inspection. An example of potential breaching of the remedy was observed during the site inspection at the MS004 property south of Silver Street in Dayton where the land surface, a portion of the surface soil remedial action, appeared to have been scraped to provide possible vehicle parking.

The reported frost penetration depth in north central Nevada is approximately 18 inches (Lyon County Building Department, personal communication). This is important to consider because most excavations for shallow construction (i.e., decks, fences, above ground swimming pools, mailbox posts, etc) would not need to reach deeper than 18 inches, which is above what is considered clean surface soil (<2 feet) in remediated areas. Any major construction projects requiring excavation below two feet (i.e., in-ground swimming pools, housing additions, etc.) are required to be permitted by Lyon County and therefore would theoretically fall within the Institutional Controls framework discussed in subsection 1.6, below, although not all residents may comply with permitting requirements.

A.2 System Operations and Maintenance:
There is no active, ongoing remedial system in place since the remedy was a removal action. Therefore, there are no formal operations or maintenance components to the remedy.

A.3 Costs of System Operations, Maintenance, and Monitoring:
There are no system operations, maintenance, and monitoring costs as per A.2, above.

A.4 Opportunities for Optimization:
There are no opportunities for system optimization as per A.2, above.

A.5 Early Indicators of Potential Remedy Problems:
The only current mechanism in place to monitor for potential remedy problems is during the site inspection of each five-year review. It is then that each remediated area is observed for signs of disturbance which may impact the protectiveness of the remedy. All but the southernmost section of MS004 were on private property; therefore, access to the remediated areas is limited. The southernmost portion of MS004 is on Dayton park land. Based on visual observation during this FYR site inspection, there were no early indicators of potential remedy problems other than that listed in A.1 above.

A.6 Implementation of Institutional Controls and Other Measures:
The following institutional controls (ICs) were described in the ROD.

- *Remediated areas:* deed or construction restrictions that prevent disturbance of subsurface mercury remaining on site and/or health and safety measures for the protection of onsite workers and residents during any future subsurface construction.

- *Non-remediated areas:* Use of an IC implementation document, referred to as the Long-Term Sampling and Response Plan (LTSRP) to "ensure that any residential development in present open land use areas known or suspected to be impacted by mercury includes characterizing mercury levels in surface soils and, if necessary, addressing impacted soils."

The ICs for the remediated areas have not been implemented. Because subsurface soil sampling was not conducted at the same frequency as surface soil sampling during the RI or RA, it is not readily apparent as to whether residual subsurface soil contamination is present or not.

NDEP sent letters to the owners of some of the remediated parcels in Aug 2000, which, in part, stated:

> *"We believe that the removal of contaminated soil and placement of clean fill have eliminated the human health risks associated with mercury-contaminated soil at your property."*

Further, " soils below those excavated were not analyzed or removed, but do not present a (any) current health risk because of the limited potential for direct contact with them, and

including recommendations for reburying and/or covering (specifying with two feet of fill in letters to two parcels) and/or soil analysis if the soils below the remediated zone are exposed or otherwise disturbed (one parcel was remediated to one-half foot below grade; the others were remediated to two feet below grade).

The FYR team reviewed the NDEP's list of mercury contaminated properties and example IC letters (see Attachment 1). After its review, the FYR Team had several IC compliance questions including:

- Did property *owners* receive the IC letters from NDEP?
- Do owners of remediated properties follow the IC backfill placement and maintenance requirements?
- Were additional letters of clarification issued?
- It is not clear if all of the parcels remediated are addressed in the previous list or if additional letters were issued, or if any parcels did not receive letters.

Also, the FYR team visited the Lyon County Recorders Office in Yerington. The purpose of the visit was to determine (1) what information related to the CRMS was recorded at the County; and, (2) what the process would be for a homeowner or prospective buyer to gather information about a property and its relation to the CRMS. During the site visit, the FYR team obtained parcel numbers from the County Assessors Office for look-up in the County Recorder's Office. No deed notices or restrictions were found on any of the sample parcel records for the remediated areas.

Regarding the implementation of ICs for non-remediated areas, the LTSRP has been drafted however it has not been finalized. Several concerns have been identified and will need to be addressed before finalizing.

- The LTRSP does not define the CRMS boundaries and there is no simple method for determining whether a property is within or outside of the CRMS.

- The LTRSP provides sampling and remediation requirements for developments with five or more units. However, no requirements are available for developments with less than five units. A new brochure has been produced to inform the public of CRMS. However, this brochure serves only as an informal IC and is not intended as a mechanism to ensure protectiveness.

- The durable notification mechanism (DNM) efforts are not as successful as the sampling and remediation efforts. Environmental covenants (ECs), covenants, conditions and restrictions (CC&Rs), and technical documents are not being recorded at the Lyon County Recorder's Office consistently. The ones that are in the system are not recorded and/or the pertinent information is not presented in a manner in which a member of the general public would easily be able to locate, understand, and use. More efforts are needed in ensuring DNMs are recorded when necessary as per LTSRP requirements, and that the DNMs include

information that educates and guides subsequent owners how to ensure they are protected against CRMS-related contamination, and when to contact the NDEP.

For a more detailed discussion of IC implementation and its relation to CRMS OU1 remedy functionality, the reader is referred to Attachment 6 (ICs Summary Report) of this report.

*Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy still valid?*

Answer: The exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection in 1995 are still valid. The 80 mg/kg residential and 300 mg/kg commercial risk-based cleanup levels for mercury are still valid for the CRMS.

B.1 Changes in Exposure Pathways:
There are no known changes in exposure pathways identified in the HHRA. For the uplands soil OU, the primary pathway remains soil ingestion.

B.2 Changes in Toxicity and Other Contaminant Characteristics:
The derivation of site-specific cleanup levels for mercury included the assumption based on analytical results that 90 percent of mercury in soil was either elemental mercury or mercuric sulfide, and the other 10 percent was soluble mercuric chloride. No sampling data, research data or other information has come to light which might alter the percentages used in risk calculations. However, if new information suggests these percentages may not be realistic, then updates to the cleanup levels may be appropriate.

Toxicity information provided in the HHRA has changed. Health Effects Assessment Summary Tables (HEAST) toxicity values used in the 1994 HHRA are currently being evaluated and are not currently published. Toxicity values published in the Integrated Risk Information System (IRIS) have undergone re-evaluation and have changed for some compounds. Table 3 provides the toxicity values used in the risk assessment and current values provided in IRIS.

B.3 Changes in Risk Assessment Methods:
There are no known changes in risk assessment methods that would alter the validity of the remedy.

B.4 Changes in standards and TBCs:
There have been no changes to the ARARs, risk-based cleanup levels, and TBCs identified in the ROD.

**Table 3 – Toxicity Value Comparison**

| COC | | Reference Dose (oral) (mg/kg-day)$^{-1}$ | Reference Dose (inhalation) (mg/kg-day)$^{-1}$ | Slope Factor (oral) (mg/kg-day)$^{-1}$ | Slope Factor (Inhalation) (mg/kg-day)$^{-1}$ | Source |
|---|---|---|---|---|---|---|
| Arsenic | 1994 HHRA | 0.0003 | - | 1.75 | 15 | IRIS |
| | Current Info | 0.0003 | - | 1.5 | - | IRIS |
| Elemental Mercury | 1994 HHRA | - | 0.0003 mg/m$^3$ | - | - | HEAST |
| | Current Info | - | 0.0003 | - | - | IRIS |
| Organic Mercury (methyl-Hg) | 1994 HHRA | 0.0003 | - | - | - | IRIS |
| | Current Info | 0.0001 | - | - | - | IRIS |

B.5 Expected Progress Towards Meeting RAOs:
The lone RAO, that of reducing human health risks by reducing exposure to surface soils containing mercury in excess of 80 mg/kg in four residential areas, is still valid.

*Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*

Answer: No other information has come to light that could call into question the protectiveness of the remedy other than the items mentioned previously in subsections A.1 and A.6, and the issues discussed in Section VIII.

*Technical Assessment Summary*

There are concerns whether the implemented remedy for OU1 (contaminated upland soils), including removal actions with ICs, and ICs in non-remediated areas, is protective in the short-term as well as the long-term.

# VIII. Issues

This section addresses issues that, either currently or in the future, prevent the upland soils OU from being protective.

**Table 4 – Issues of the 2008 Five-Year Review**

| Issue | Affects Protectiveness? (Y or N) | |
|---|---|---|
| | **Current** | **Future** |
| 1. ICs – Finalization of the LTSRP | Y | Y |
| 2. ICs - Prevention of subsurface (>2 feet) disturbance in previously remediated areas or prevention of surface disturbance to expose subsurface, due to lack of ICs implementation in remediated areas | Y | Y |
| 3. ICs – Durable notification mechanisms (DNMs) are not being recorded for newly developed areas with Lyon County as per LTSRP requirements | Y | Y |
| 4. ICs – Protectiveness of residential developments of less than five units, and commercial developments of less than five acres | Y | Y |

Because the draft version of the LTSRP is currently being followed and NDEP has reported all parties have voluntarily complied with its contents to date, currently there are no protectiveness issues associated with the LTSRP finalization. However, should

a developer choose not to comply with the draft LTSRP, protectiveness is potentially affected for Issue #1 above.

# IX. Recommendations and Follow-up Actions

Table 5 lists developed recommendations and follow-up actions for each issue identified in Table 4.

**Table 5 – Recommended Follow-Up Actions**

| Issue | Recommendations/ Follow-Up Actions | Party Responsible | Oversight Agency | Planned Completion Date |
|---|---|---|---|---|
| 1. ICs – Finalization of the LTSRP | Finalize Plan | NDEP | USEPA | Sep 2009 |
| 2. ICs – Lack of ICs in remediated areas | Ensure residents of remediated properties are not exposing subsurface (>2 ft bgs) soil; or subsurface sampling to confirm elimination of risk | NDEP | USEPA | Sep 2009 |
| 3. DNMs not being recorded for previously undeveloped areas | Development of more effective process to be defined in final LTSRP to record DNMs with Lyon County when required | NDEP | USEPA | Sep 2009 |
| 4. ICs – Protectiveness of small-scale developments | Create mechanism to identify potential small-scale (<5 units or <5 acres) developments within CRMS, to be defined in final LTSRP | NDEP | USEPA | Sep 2009 |

# X. Protectiveness Statement(s)

Protectiveness Statement:
The OU1 remedy is not protective.
[Detailed statement to be drafted by EPA Region 9 at their request]

## XI. Next Review

The next five-year review for the Carson River Mercury Site is required by Sep 2013, five years from the date of this review.

# Figures

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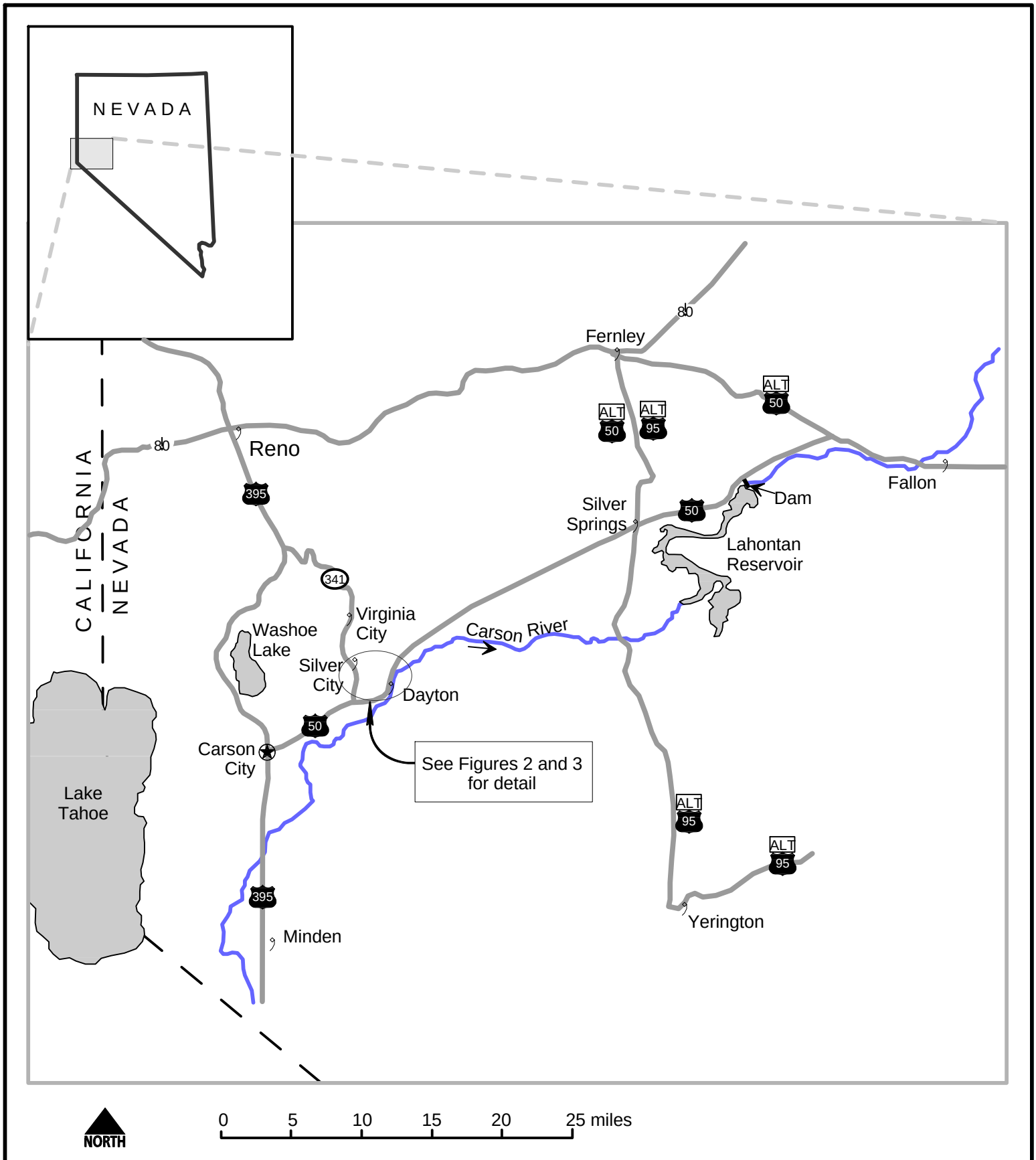


U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT

**Carson River Mercury Superfund Site**
**Vicinity Map**

Second Five-Year Review Report

| Lyon County | **Figure 1** | Nevada |
|---|---|---|

*Drawing based on Fig. 2-1, First FYR Report (USEPA, 2003)*

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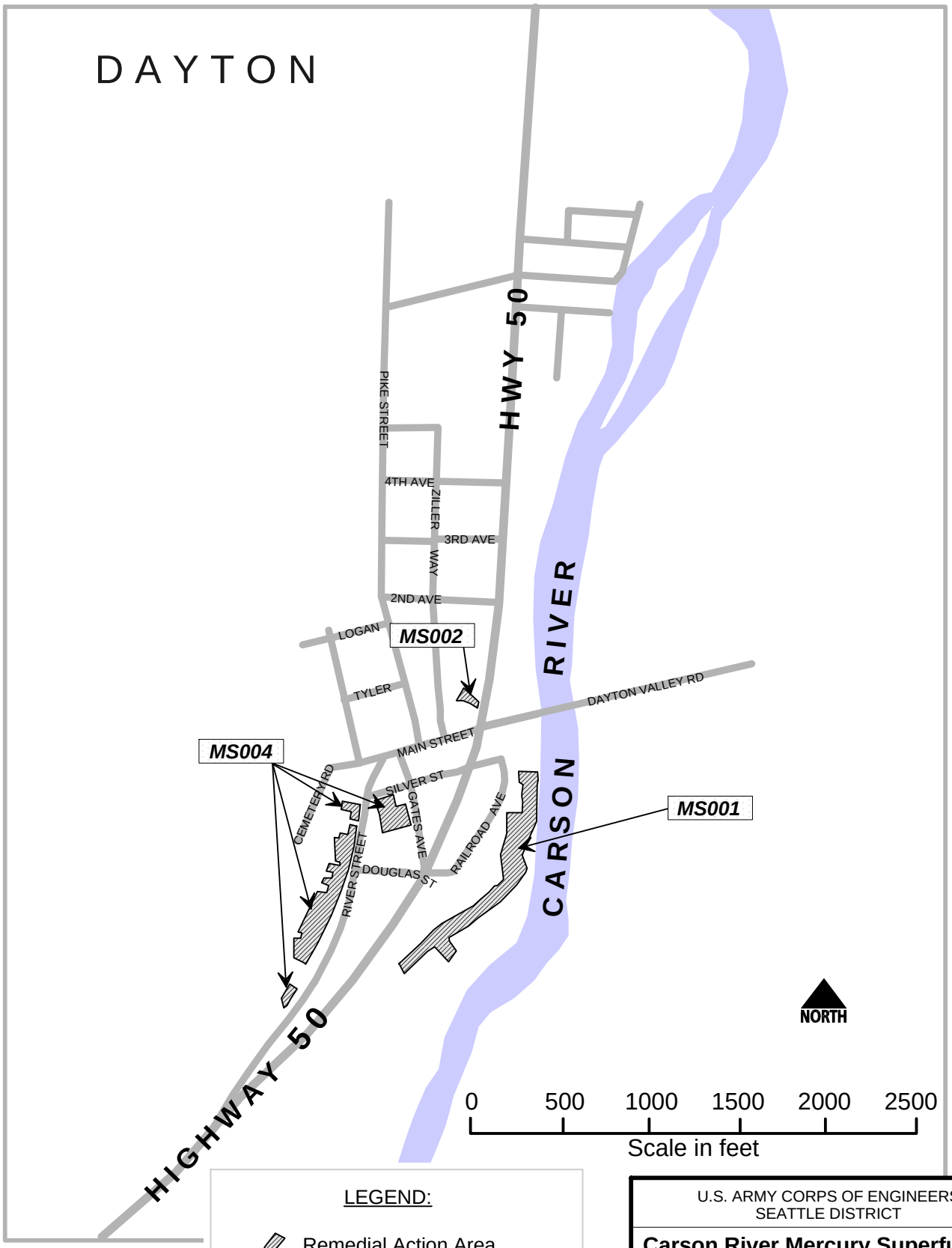


*Drawing based on Fig. 4, ROD (USEPA, 1995)*

U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT

**Carson River Mercury Superfund Site**
**Dayton Detail Map**

Second Five-Year Review Report

| Lyon County | **Figure 2** | Nevada |
|---|---|---|

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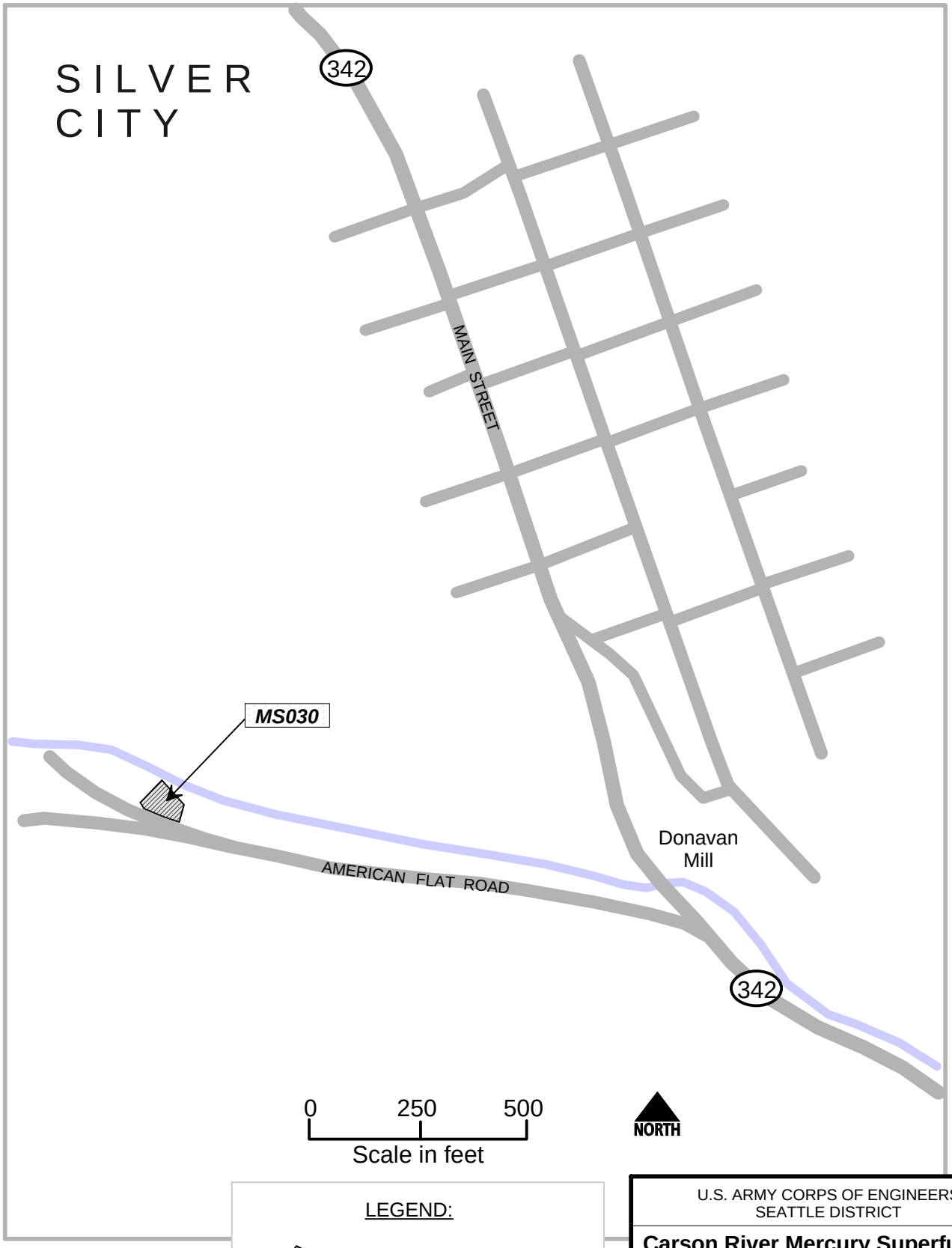


U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT

**Carson River Mercury Superfund Site**
**Silver City Detail Map**

Second Five-Year Review Report

| Lyon County | **Figure 3** | Nevada |
|---|---|---|

*Drawing based on Fig. 2-3, First FYR Report (USEPA, 2003)*

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# Attachment 1

*List of Documents Reviewed*

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LIST OF DOCUMENTS REVIEWED

Ecology and Environment, Inc. (E&E, Inc.), 1994. Feasibility Study, Carson River Mercury Site. Dec 1994. Prepared for USEPA.

E&E, Inc., 2000. Remedial Action Report, Carson River Mercury Site, Operable Unit 1 – Surface Soil, Dayton and Silver City, Nevada. May 2000. Prepared for USEPA.

E&E, Inc. and Haddan Engineering, various dates. Various oversize Remedial Action drawings (unpublished?).

Nevada Division of Environmental Protection (NDEP). [Draft] Carson River Mercury Superfund Long-Term Sampling and Response Plan (LTSRP), Risk-Assessment and Management Guidelines. Date unknown. Prepared for USEPA Region 9.

NDEP and Lyon County. 2008. Carson River Mercury Site Brochure. Apr 2008.

NDEP. Carson River Mercury Site LTSRP Sampling and Action Tracking Database (unpublished). Date unknown.

Singh, A., 1995. Draft Geostatistical Analysis of Mercury Concentrations in Soils of Dayton, Nevada for the Carson River Superfund Site. Mar 1995. Prepared for Lockheed Environmental Systems & Technologies, Las Vegas.

US Environmental Protection Agency (USEPA), 2003. First Five-Year Review Report for the Carson River Mercury Site, Dayton and Silver City, Lyon County, Nevada. Sep 2003.

USEPA, 1995. Record of Decision for Carson River Mercury Site, West Central Nevada, Operable Unit 1: Surface Soil. Mar 1995.

USEPA, 1994. Revised Draft Human Health Risk Assessment and Remedial Investigation Report, Carson River Mercury Site. Dec 1994.

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# Attachment 2

*Review of ARARs*

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ARARs Review Summary, Carson River Mercury Site

| Medium | Source/ARAR | Applicable or Relavant and Appropriate | Requirement Synopsis | Initial Comment on Application | Current ARAR Evaluation |
|---|---|---|---|---|---|
| Action-Specific ARARs | | | | | |
| Soil | Resource Conservation and Recovery Act (RCRA) | Not Applicable | RCRA requirements exempted because Bevill amendment (exempting mining wastes from definition of hazardous waste) applies | EPA has determined that excavated wastes that exceed the mercury standards for the TCLP text (i.e., TCLP exceeds 0.2 mg/l) will be either treated and disposed at a municipal landfill, or disposed at a hazardous waste landfill. | This ARAR is still not applicable for this Site. Should excavated soils exceed mercury standards for TCLP, these material shall be treated and disposed in a municipal landfill or disposed in a hazardous waste landfill. |
| Soil (dust) | Nevada Administrative Code §445.734 (Fugitive Dust Emissions) | Applicable | Requires handling, transporting or storing of any material be performed in a manner which does not allow controllable particulate matter to become airborne | Excavation of mercury-contaminated soils to comply with this regulation | This ARAR is still applicable for this Site. |
| Location-Specific ARARs | | | | | |
| Soil | Executive Order No. 11988; 40 CFR §6.302(b); 40 CFR Part (Appendix A) | Applicable | Actions shall be taken to reduce the risk of flood loss within the 100-year flood plain | Remedial actions within the Carson River 100-year flood plain are to be performed in a manner that it does not increase the risk of flood loss | This ARAR is still applicable. |
| Soil | Executive Order No. | Potentially | Requires Federal | MS001 adjacent to | This ARAR is still |

| Medium | Source/ARAR | Applicable or Relavant and Appropriate | Requirement Synopsis | Initial Comment on Application | Current ARAR Evaluation |
|---|---|---|---|---|---|
| | 11990 on Protection of Welands | Applicable | agencies to avoid, to the extent possible, adverse impacts associated with the destruction or loss of wetlands | Carson River, although no known designated wetlands were identified | applicable should wetlands be affected. |
| Soil | Clean Water Act §404; 40 CFR Part 230; 33 CFR Part 320-330 | Potentially Applicable | These requirements protect wetlands by prohibiting the discharge of dredged or fill material without a permit | MS001 adjacent to Carson River, although no discharges of this type were planned or conducted | This ARAR is still potentially applicable should discharges of this nature are planned or conducted. |
| Soil | Archaelogical and Historical Preservation Act, 16 USC §469, 40 CFR §6.301(b) and (c) | Potentially Applicable | Establishes procedures to preserve historical and archaeological data which might be destroyed through alteration of terrain as a result of Federal activity | No known historical or archaeological impacts encountered | This ARAR is still applicable should archaeological or historical data be encountered. |
| To Be Considered (TBCs) | | | | | |
| Soil | *Nevada Contaminated Soil and Groundwater Remediation Policy* (Jun 25, 1992) | Cleanup Level | Policy states cleanup level for mercury to be 20 mg/kg unless a site-specific risk assessment determines otherwise | CRMS HHRA (EPA, 1994) determined cleanup levels for mercury at 80 mg/kg residential and 300 mg/kg commercial. This risk-based standard is applicable for the Site. | The EPA risk-based standard is still applicable for the site |
| Soil | *Nevada Bureau of Mining Regulation and Reclamation Guidance Document for* | TBC | Ensures mine wastes are not placed in an unmanaged disposal facility. If TCLP not met, | Applied to high-mercury soils excavated from MS001, MS002, | This TBC is still applicable |

| Medium | Source/ARAR | Applicable or Relavant and Appropriate | Requirement Synopsis | Initial Comment on Application | Current ARAR Evaluation |
|---|---|---|---|---|---|
| | *Alternate Use of Mine Waste Solids – Disposal Outside of Containment* (May 3, 1994) | | then material must be treated before disposal at a RCRA municipal landfill, or else disposed at a RCRA hazardous waste landfill | MS004, MS030 | |

*Note:*
*ARARS summary based on discussion of ARARS in Record of Decision (EPA, 1995), Section 9.2.2.*

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# Attachment 3

*Site Visit/Trip Report, with Photographs*

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TRIP REPORT
CARSON RIVER MERCURY SITE, CARSON CITY, NV
(EPA ID: NVD980813646, Region 9)

---

1. INTRODUCTION

a. Dates of Visit: 3-6 Mar 2008
b. Location: Carson City, NV; Dayton and Silver City, Lyon County, NV
c. Purpose: This site visit was conducted to meet the needs of the five-year review (FYR).
d. Travelers:

Ms. Sheri Moore, US Army Corps of Engineers, Seattle District, (206) 764-3467
Mr. Jefferey Powers, US Army Corps of Engineers, Seattle District, (206) 764-6586

e. Contacts:

Mr. Jeryl Gardner, Nevada Division of Environmental Protection, (775) 687-9385
Mr. Sam Jackson, Nevada Division of Environmental Protection, (775) 687-9381
Mr. Nick Malarchik, Lyon County Building Department

2. SITE VISIT SUMMARY

Ms. Moore and Mr. Powers ("USACE team") arrived in Reno, NV the morning of 3 Mar 2008 via air travel from Seattle, WA. The USACE team drove from Reno to Carson City by way of a route through Virginia City. Virginia City was visited by the team to gain historical perspective of the Carson River Mercury Site (CRMS). Virginia City was the main hub of activity during the Comstock Mining era, primarily from 1860 to 1900. It was during that time that the processes that caused the contamination being dealt with under the CRMS Superfund Site was in use and releasing mercury into the environment. The USACE team spent some time looking at the town, the surrounding mine sites and remaining tailings piles, and then drove through another historical town, Silver City. Silver City was important to visit because one of the sites remediated during the 1999 remedial action is located in Silver City. The USACE team attempted to visit the site, but a lack of road signs prevented the team from knowing if they were on the right street. The team then drove through Dayton, another town within the CRMS, on their way to Carson City. The team did not attempt to locate the remediation sites in Dayton without the support of the NDEP team.

On Tuesday, 4 Mar 2008, the USACE team met with Mr. Jeryl Gardner and Mr. Sam Jackson of the Nevada Division of Environmental Protection (NDEP) Bureau of Corrective Actions (BCA) at 09:00 to begin discussions on the CRMS. Mr. Gardner is very knowledgeable on the Site and was helpful to the USACE team by describing the history and the institutional controls (ICs) to date. The USACE team spent approximately three hours with Mr. Gardner discussing the site history and current conditions. In the afternoon, the USACE team drove to Yerington in Lyon County. Yerington is the county seat for Lyon County; the main county of the CRMS. The purpose of the trip to Yerington by the USACE team was to visit the County Assessor's and

Recorder's office to conduct research on Site ICs. The trip to Yerington took from approximately 13:00 to 18:00.

On Wednesday, 5 Mar 2008, the USACE team met with the NDEP team to (1) meet with the Lyon County Building Manager, Mr. Nick Malarchik, to discuss ICs, and (2) to conduct the five-year review (FYR) site visit. The team met with Mr. Malarchik at the Lyon County satellite office in Dayton at 10:00. As the Lyon County Building Manager, Mr. Malarchik has been working with the NDEP on a brochure that is intended to be provided to property owners who require building permits from Lyon County. The site visit team (USACE and NDEP teams) discussed the status of the brochure, necessary steps to get it released, and possible outcomes once the brochure is available. More formal ICs were also discussed. After spending approximately one hour with Mr. Malarchik, the site visit team began visiting the remedial sites. The site visit team visited remedial action sites MS004, MS001, and what was thought to be MS002 in Dayton, and then after lunch, MS030 in Silver City. The team also reconnoitered Santa Maria Ranch, which is one of the new housing developments along the Carson River on property that once contained a mill site. Mr. Gardner and Mr. Jackson talked about soil sampling for mercury, the sampling results, and actions taken by the developer to get the property ready for residential use. After visiting Santa Maria, the site visit team headed back to the NDEP office in Carson City to look at NDEP records for additional information not in the Superfund Record Index that the USACE team had as a reference. During the record review, the team realized that the location for MS002 was not consistently shown on different maps. The USACE team took the information from pre-remediation drawings, RI figures, and the RA Report figures and went back to Dayton to find the right MS002 location. Based on the greatest number of referenced features, it appears that the location of MS002 shown in the RI figures is correct. The USACE team returned to their hotel by 17:30.

On Thursday, 6 Mar 2008, the USACE team drove from Carson City, NV to Reno to fly back to Seattle. The team returned their rental car and was at the airport by 08:30 for their 10:40 flight. The USACE team returned to Seattle at 13:00 with the site visit completed.

## 3. DISCUSSION

The Carson River Mercury Site (CRMS) is a USEPA-led CERCLA site for which a FYR is being conducted with technical assistance from Seattle District USACE. This FYR is the second FYR for the CRMS. The first FYR was completed in Sep 2003; the second is scheduled for completion in Sep 2008. The trip to Carson City and the surrounding area was made to conduct the site inspection and complete the Site Inspection Checklist components of the FYR. Furthermore, the site visit was necessary in providing the USACE technical team the opportunity to become more familiar with the CRMS, the remedial actions implemented, and the ICs, an important part of the site remedy.

**Institutional Controls**

The ICs for this Site are continually being developed and updated to meet the intention in the ROD. The ROD calls for a Long-Term Sampling and Response Plan (LTSRP) to be developed by EPA Region 9 that includes all the ICs for the Site. To date, the LTSRP has not been finalized. The NDEP has been tasked by EPA Region 9 to initially develop the LTSRP based on their local site knowledge and proximity to other local authorities critical for the implementation of any IC. The NDEP has been working internally to extend ICs to the maximum of their ability. NDEP has also been working with Lyon County to expand the informational aspect of ICs to allow the public to understand what the potential mercury-related risks may be. The USACE team spent time with NDEP to understand what the current ICs are, how they can be tracked by regulatory agencies and the public, and what direction the ICs and LTSRP are headed in the future. Details on the outcome of these discussions, the research at the Lyon County Assessors and Recorders offices, and the visit to Santa Maria Ranch are presented in the IC memo, Attachment 6 of the FYR. The site visit was instrumental in providing sufficient information for the USACE team to be able to properly document the current status of ICs in the FYR.

**Remediated Sites**

The team visited the four sites remediated as part of the remedial action required in the ROD. No property owner was disturbed during the site visit and private property was not intruded upon. MS001 was viewed at a distance by driving along Railroad Avenue in Dayton. Since MS001 is located on private property behind residences along Railroad Avenue and adjacent to the Carson River, an in-depth assessment of conditions at this site could not be made. A flood event of the Carson River system reportedly occurred in Jan 2007 and may have eroded portions of MS001. Overall, there does not appear to be significant changes to the remediated areas viewed that may cause the remedy to not be protective. However, there have been some activities adjacent to MS004 that caused the team to question the possible extent of the remedy and what lengths are reasonable after the action. At MS004, the adjacent property is a mini-mart that, based on the team's interpretation of the site, recently re-graded and put down new gravel in their driveway. The soil graded from the mini-mart has been pushed up into piles along the sidewalk adjacent to the remediated public land and next to the remediated residential land.

**Overall**

This change in site condition at MS004 could cause the previously remediated areas to be recontaminated with mercury-containing soils. However, at this point, the team was not able to assess whether the graded materials were in an area that had high levels of mercury, it's more of a question of what would EPA do to continue to ensure that those four areas remain below the residential level. And of course, this question could extrapolate out to the larger site, as well. The CRMS is a very large area with just as large number of property owners who are able to do with their property what they wish. The question to be answered by a FYR is whether the remedy remains protective. But at this site, by what mechanism can EPA ensure protectiveness given the large and unknown extent of mercury surface and subsurface contamination in

Operable Unit 1? This remains a difficult and complex question to address and an assessment of protectiveness is difficult given the aforementioned site challenges.

Ms. Sheri Moore
Chemical Engineer
CENWS-EC-TB-ET

Photo 1. Northernmost end MS001 (Dayton).

Photo 2. Most probable MS002 (Dayton) location.

Photo 3. Dayton public park at southernmost end of MS004.

Photo 4. Minor erosion of slope behind retention wall, southern end of MS004.

Photo 5. Recently re-graded lot within MS004.

Photo 6. Piles of recently disturbed soil adjacent to re-graded lot, MS004.

Photo 7. MS030 (Silver City) from American Flat Road.

Photo 8. Undeveloped lots of Santa Maria Ranch, Dayton, NV.

# Attachment 4

*Site Inspection Checklist*

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# Site Inspection Checklist

| I. SITE INFORMATION | |
|---|---|
| **Site name:** Carson River Mercury Site | **Date of inspection:** 05 Mar 2008, 11:00 – 4:30 |
| **Location and Region:** Carson City, NV, Region 9 | **EPA ID:** NVD980813646 |
| **Agency, office, or company leading the FYR:** US Army Corps of Engineers for EPA Region 9 | **Weather/temperature:** Sunny, windy w/ no clouds; 45 degrees Fahrenheit |

**Remedy Includes**: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☒ Other: Past removal and/or capping of surface soils contaminated with mine tailings from the Comstock Mine era.

**Attachments:** ☒ Inspection team roster attached ☐ Site map attached

**Inspection team:** Jeryl Gardner and Samuel Jackson (NDEP); Sheri Moore and Jefferey Powers (USACE)

**II. INTERVIEWS** (Check all that apply)

1. **O&M site manager** ☒ N/A

2. **O&M staff** ☒ N/A

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency Nevada Division of Environmental Protection (NDEP)
Contact Jeryl Gardner | Environmental Scientist | 03/05/08 | 775-687-9385
Name | Title | Date | Phone no.
Problems; suggestions. ☒ Report attached
The IC attachment to the FYR contains comments and suggestions from Mr. Gardner of the NDEP.

Agency NDEP
Contact Samuel Jackson | Supervisor, Superfund Branch | 03/05/08 | 775-687-9381
Name | Title | Date | Phone no.
Problems; suggestions. ☒ Report attached
The IC attachment to the FYR contains comments and suggestions from Mr. Jackson of the NDEP.

Agency Lyon County Building Department
Contact Nick Malarchik | Department Director | 03/05/08 | 775-463-6591
Name | Title | Date | Phone no.
Problems; suggestions. ☒ Report attached
The IC attachment to the FYR contains comments and suggestions from Mr. Malarchik of the NDEP.

4. **Other interviews** (optional) ☐ Report attached.

**III. ON-SITE DOCUMENTS & RECORDS VERIFIED** (Check all that apply)

1. **O&M Documents**

| | | | |
|---|---|---|---|
| ☐ O&M manual | ☐ Readily available | ☐ Up to date | ☒ N/A |
| ☐ As-built drawings | ☐ Readily available | ☐ Up to date | ☒ N/A |
| ☐ Maintenance logs | ☐ Readily available | ☐ Up to date | ☒ N/A |

Remarks_____

2. **Site-Specific Health and Safety Plan** ☐ Readily available ☐ Up to date ☒ N/A
   ☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☒ N/A
   Remarks_____

3. **O&M and OSHA Training Records** ☐ Readily available ☐ Up to date ☒ N/A
   Remarks_____

4. **Permits and Service Agreements**

| | | | |
|---|---|---|---|
| Air discharge permit | ☐ Readily available | ☐ Up to date | ☒ N/A |
| Effluent discharge | ☐ Readily available | ☐ Up to date | ☒ N/A |
| Waste disposal, POTW | ☐ Readily available | ☐ Up to date | ☒ N/A |
| Other permits_____ | ☐ Readily available | ☐ Up to date | ☒ N/A |

   Remarks_____

5. **Gas Generation Records** ☐ Readily available ☐ Up to date ☒ N/A
   Remarks_____

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date ☒ N/A
   Remarks_____

7. **Groundwater Monitoring Records** ☐ Readily available ☐ Up to date ☒ N/A
   Remarks_____

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒ N/A
   Remarks_____

9. **Discharge Compliance Records**

| | | | |
|---|---|---|---|
| Air | ☐ Readily available | ☐ Up to date | ☒ N/A |
| Water (effluent) | ☐ Readily available | ☐ Up to date | ☒ N/A |

   Remarks_____

10. **Daily Access/Security Logs** ☐ Readily available ☐ Up to date ☒ N/A
    Remarks_____

**IV. O&M COSTS** ☒ N/A

## V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

### A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A
Remarks The site is too large to designate fencing as a control and none of the remediated areas had fencing to protect the remediated area.

### B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A
Remarks_____

### C. Institutional Controls (ICs)

1. **Implementation and enforcement**
Site conditions imply ICs not properly implemented ☐ Yes ☐ No ☒ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☐ No ☒ N/A
Remarks: The ICs program is a work in progress for the site, so an evaluation of whether they are being properly implemented is not applicable. The NDEP is developing, with EPA Region 9, the Long-Term Sampling and Response Plan (LTSRP) that outlines the ICs for the site. The ICs to date primarily apply to land developments with 5 or more homes which must go through the NDEP for approval, which includes analysis of whether any of the development is in an area of concern and, if so, then the sampling plan for remediation must be submitted and approved by NDEP.
Type of monitoring (*e.g.*, self-reporting, drive by) Monitoring of developments containing five homes or more is overseen by the NDEP.
Frequency: Each time a developer submits plans to the NDEP Bureau of Water Pollution Control, they become involved in the IC program via the NDEP Bureau of Corrective Actions.
Responsible party/agency: The NDEP is the implementing agency for ICs.
Contact: Jeryl Gardner (Name) Environmental Scientist (Title) 03/05/08 (Date) 775-687-9385 (Phone no.)
Reporting is up-to-date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A
Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☒ N/A
Violations have been reported ☐ Yes ☒ No ☐ N/A
Other problems or suggestions: ☒ Report attached
Remarks While the ROD does specify that deed restrictions be implemented as part of the remedy, the ROD does not specify how those will be implemented, where they apply, and who is to initiate the restrictions.

2. **Adequacy** ☐ ICs are adequate ☒ ICs are inadequate ☐ N/A
Remarks: The ICs to date are not adequate to address every potential property that may be impacted by or within the CRMS. The scope of such ICs may be too difficult to implement. The progress of IC implementation is going well and may even improve more as programs are successfully developed.

### D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☐ No vandalism evident ☒ N/A
Remarks_____

2. **Land use changes on site** ☐ N/A
Remarks: Changes in land use were checked at the remediated areas. All did appear to remain as residential areas.

3. **Land use changes off site** ☐ N/A

Remarks: Land use changes off site primarily consist of property developments in areas formerly used for ranching or which were undeveloped. These areas with developments of 5 or more homes are part of the IC system; developments w/ 4 homes or fewer are not directly part of the IC system. NDEP is working w/ Lyon County Building Department to educate property owners on the possibility of their property being in the CRMS and to contact NDEP if they have concerns.

## VI. GENERAL SITE CONDITIONS

**A. Roads** ☐ Applicable ☒ N/A

**B. Other Site Conditions** ☐ N/A

**Remarks**:

Site conditions were reviewed for the four locations that had undergone remediation in 1999 and one of the new property developments that are part of the IC program. The remediation at the four sites was conducted as part of the remedial action in accordance with the ROD and recorded in the Remedial Action Report (EE, May 2000). The development was visited to show the proximity of this particular development to sites of known mercury contamination – the Carson River and a former mill site (New Ophir). All locations were sufficiently accessible to perform a physical assessment of the conditions. Site visit photographs are included in the Five-Year Review Trip Report attachment.

MS004. MS004 was the first site visited. This remediation site consists of a small park, residential property, and public property along River Street in Dayton. Remediation in 1999 consisted of excavation with backfilling and a 6-inch cap at the residence over 36,603 sq ft. The site visit team started at the southernmost point of MS004, the park, and walked along the site to the residential area. The park surface soils and grasses appeared to be in good condition and without the presence of mine tailings. The section of MS004 along the road is separated from the unremediated hillside by a retaining wall placed in 1999. The retaining wall was placed to prevent potentially contaminated soil from reaching the remediated area. Although minor erosion of the slope was observed to have occurred, it appeared that the retaining wall is functioning as intended because all spalled rock and soil was retained behind the wall. The hillside was seeded w/ native seed in 1999. Evidence of the seeding effort is still visible on the hillside (green patches); vegetation is present, but the site visit team did not determine if it was from the seeding or was there prior to the adjacent remedial action. The residential area has been altered since the time of the remedial action. The home that was present on the site has been demolished and no one lives on site. Additionally, there has been some excavation and grading adjacent to the remediated site. The adjacent property contains a mini-market with a large parking lot. It appears that the unpaved portion of the parking area has recently been graded. The material from the parking area has been pushed into piles that may be overlapping some of the remediated area. It is not clear from available figures if any of the grading may have impacted the cap placed at 150 Douglas Street. Additionally, the contamination within the graded and piled material, while possibly characterized during the RI, is currently unknown.

MS001. MS001 was the second site visited. This site consists of residential yards along the Carson River, east of Hwy 50 and Railroad Street. Remediation at MS001 consisted of excavation with backfilling and 2-feet of capping in some areas, over approximately 92,434 sq ft. The amount of site visited by the team was limited because MS-001 consists of private residences. The residences extend from the street to the river. The team conducted multiple drive-bys to view as much of the remediated areas as possible. Based on the portions that were visible from the road, the remediated areas did not appear to contain mine tailings or to have changed in land use from residential.

MS002. MS002, also in Dayton, was the third site visited and was also revisited later in the day. Site remediation consisted of excavation and backfilling of 988 sq ft. This site did not appear to be too difficult to locate initially. The team used figures from the RA Report and the first FYR. The area depicted in those figures is along a wash between the US Post Office and a credit union. The site was photographed and appeared unchanged post-remediation. Later in the day, back at the NDEP office, the team found pre-remediation drawings that showed a different MS002 location. An additional drawing showed site features such as other trailers and contours. The location in this drawing was much further south. Given the lack of firm features in the first site,

the USACE team members went back out to look at the newly discovered location. The new location lacked the features shown in one of the scoping figures. The USACE team then consulted RI maps for a possible location. The RI figures showed MS002 in another location. The team drove to that location and found a sufficient number of features that matched to decide that this, out of the three possible locations, was the most likely one. The primary similarity was one of the three trailers depicted in the site feature figure was present on site and oriented in the same manner as the drawing. The apparent location of MS002 is between 2nd and 3rd Streets, between Hwy 50 and Ziller Street (See Figure 2 of this FYR report).

MS030. MS030 was the fourth of four remediated sites visited. This site is located in Silver City. Site remediation at MS030 consisted of excavation of 4,416 sq ft of tailings to native soil. During the site visit, the team drove by the area depicted on the RA report figure to observe the remediated area. The site is located on what appears to be a single residence on the northern side of American Flat Road. The residence was not disturbed during the site visit. The area appeared to remain graded and free from tailings. However, further downstream, near but not adjacent to the residence, potential tailings were observed by the team.

On the way to MS030, the team stopped to observe a former mine site located at Sugarloaf Hill. The mill had been dismantled, but the stone walls that were built in the early 20th century remain. The former settling pond is still visible and was currently holding a small amount of water. None of the remediated sites are located near this mill; the mill was visited to provide perspective on the operations during the mining years.

After visiting the remediated sites, the team visited one of the new developments that have been part of the ICs process. This development, the Santa Maria Ranch, was located just outside of Dayton off of Hwy 50 East. NDEP representatives pointed out features such as the areas sampled, the areas with high mercury concentrations in the shallow soil that were excavated and backfilled, and the former mill area. The ICs program led the developer to collect and analyze 100 pre-finished grade surface soil samples, perform limited surficial excavation and replacement with clean fill, and collect and analyze over 400 finished grade surface samples to insure mercury concentrations in soil were within acceptable residential limits.

**VII. LANDFILL COVERS** ☐ Applicable ☒ N/A

**VIII. VERTICAL BARRIER WALLS** ☐ Applicable ☒ N/A

**IX. GROUNDWATER/SURFACE WATER REMEDIES** ☐ Applicable ☒ **N/A**

**X. OTHER REMEDIES**

No additional remedies are applicable for the CRMS.

**XI. OVERALL OBSERVATIONS**

**A. Implementation of the Remedy**

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The remedy described in the ROD was to accomplish two objectives. The first objective was to remediate surface soil at the residences and public areas. This action appears to be effective and functioning as intended. This assessment is based on observations made during the site visit and discussions with NDEP representatives. The other part of the remedy described in the ROD is ICs. That part of the remedy appears to be in a state of growth that should continue to be developed in order to be protective as intended in the ROD.

| B. | **Adequacy of O&M** ☒ N/A |
|---|---|
| | Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. |

| C. | **Early Indicators of Potential Remedy Problems** |
|---|---|
| | Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.<br>There are no early indicators of potential remedy problems. |

| D. | **Opportunities for Optimization** |
|---|---|
| | Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.<br>Optimization for ICs is currently being implemented by NDEP as discussed previously. No additional opportunities are noted at this time. |

# Attachment 5

*NDEP and Lyon County CRMS Brochure*

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## History

In the late 1800's more than 14,000,000 pounds of mercury used for mining was lost in the Carson River drainage system. With the primary transport mechanism for mercury being water, mercury has remained in the sediments of the Carson River, including Lake Lahontan and terminal desert wetlands of the Carson Sink and Carson Lake. Also, much of the mercury remains in the surface soils at the mill sites, areas downstream from the mill sites and in the drainages that connect the mill sites to the Carson River.

About 130 mills in the Carson River watershed have contributed to mercury in surface soils. They extend from Carson City to east of Dayton, and from Silver City and Gold Hill through Six-Mile Canyon and Gold Hill Canyon down to the Carson River.

# Who to contact

The NDEP works with developers and utilities to provide guidance for sampling of soils in the Carson River area. The Lyon County Building Department will act as a point of contact for local residents and advise those who obtain building permits in the area to contact the NDEP's Bureau of Corrective Actions before disturbing soils more than two feet below the surface. If you are unsure if this applies to you, please feel free to contact the NDEP's Bureau of Corrective Actions for assistance.

**Nevada Division of Environmental Protection**
Bureau of Corrective Actions
http://ndep.nv.gov/mercury/index.htm
(775) 687-9368

**Environmental Protection Agency**
http://www.epa.gov/superfund/
(415) 947-8709

**Lyon County**
http://www.lyon-county.org/
(775) 463-6591

**Nevada Department of Wildlife**
http://www.ndow.org/fish/health/index.shtm
(775) 688-1500

# Carson River Mercury Site

## Areas potentially impacted:

Former Comstock-Era gold mill sites and the Federal Emergency Management Agency 100 year flood plain of the Carson River and its tributaries, particularly the Dayton area.

LYON COUNTY

ndep
NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
protecting the future for generations

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

The Nevada Division of Environmental Protection (NDEP) is working to identify and monitor potential risks to the public, as a result of mercury in soil.

Residents in the areas below who are considering or involved in activities which may disturb the soils deeper than two feet need to contact the NDEP. Activities may include building an addition to a house, or outbuilding, deck construction, a swimming pool, planting trees and public activities such as trenching for underground utilities and cables.

**Areas potentially impacted:**
Former Comstock-Era gold mill sites and the Federal Emergency Management Agency 100 year flood plain of the Carson River and its tributaries, particularly the Dayton area.

## Why is this important to you?

This area is listed on the Superfund National Priorities List. Superfund is the name given to an environmental program established to address abandoned hazardous waste sites. This area is included due to mercury from historic mining in the area.

## Cleanup

Areas identified with mercury-contaminated surface soils underwent a cleanup process. The cleanup included the excavation of contaminated soils in the top two feet, offsite disposal of the soil, replacement of the contaminated soil with at least two feet of clean fill, grading and surface contouring.

Once cleanup conditions are met, commercial and residential developers within the cleanup area work with the NDEP to protect human health and the environment by sampling and demonstrating that the level of mercury in the top two feet of soil is at concentrations less than the health-based levels of concern. Soil below the top two feet has not been sampled and analyzed. Upon notification of an activity described above, the NDEP will determine if this soil should be tested.

## Safety

Mercury can affect people's health through long-term, low-level exposure to mercury contaminated soil via ingestion. Children aged 1 – 6, who may inadvertently consume dirt while playing, are the most susceptible.

## Wildlife

The Nevada State Health Division has issued health advisories recommending limits on consumption of fish species from six northern Nevada waters, due to elevated levels of methylmercury. The health advisories recommend no consumption of fish from Lahontan Reservoir and the Carson River from Dayton downstream to the reservoir.

# Attachment 6

*Institutional Controls Summary Report*

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# Institutional Controls Summary Report for the Carson River Mercury Site, Operable Unit 1

## *1. Introduction*

Institutional controls (ICs) are designed to prevent exposure to contamination, usually through restrictions on the use of land, ground and surface water, and/or other media, where contaminant levels do not allow for unlimited use/unrestricted exposure. ICs may also be used to prevent interference with remedy components or operation of the remedy.

## *2. ICs Required by the Record of Decision*

The Carson River Mercury Site (CRMS) Record of Decision (ROD), signed by the US Environmental Protection Agency (EPA) on 30 Mar 1995, provided for ICs in two sections pertaining to Operable Unit 1 (OU1). OU1 addresses uplands soil contaminated with mercury associated with the Comstock Mining era ore processing.

The ROD requires ICs for the subsurface soils in areas to be remediated and for land undeveloped at the time of the ROD. Remediation consisted of excavation of surface soil (down to 2 feet bgs) followed by backfill with clean material, or placement of 2 feet of clean fill. For the remediated areas, the ROD requires ICs if subsurface (greater than 2 feet bgs) contamination remains. According to the ROD, such ICs would consist of "deed or construction restrictions… to prevent disturbance of subsurface mercury remaining onsite, and/or to require health and safety measures for the protection of onsite workers and residents during any future subsurface construction."

For un-remediated areas within the Site, an IC implementation document, referred to as the Long-Term Sampling and Response Plan ("LTSRP"), is to be used to

> *"ensure that any residential development in present open land use areas known or suspected to be impacted by mercury includes characterizing mercury levels in surface soils and, if necessary, addressing impacted soils."*

The LTSRP provides sampling guidelines for characterizing mercury levels in surface soils, instructions for interpreting and reporting sample results, instructions for follow-up sampling, and instructions for addressing mercury affected soil areas within the CRMS, which includes specific portions of Sixmile Canyon and its alluvial fan, Brunswick Canyon, Carson River Floodplain above Lahontan Dam, and Carson River Floodplain below Lahontan Dam.

The LTSRP is being developed by EPA and Nevada Division of Environmental Protection (NDEP) Bureau of Corrective Action (BCA) to provide guidance for residential development projects consisting of five units or more.

The ROD anticipates that NDEP is to notify EPA of any recalcitrant parties and EPA may use Comprehensive Environmental Response, Compensation, and Liability Act authorities to enforce compliance with the guidelines.

## *3. ICs for the Remediated Soil Areas*

The ROD required approximately 5,000 cubic yards (cy) of mercury contaminated soil to be excavated from four separate properties located within either single or multiple parcels of land; however, the Remedial Action (RA) Report describes that a total of 9,087 cy of mercury contaminated soil was ultimately removed.

The remediated properties had letters from the EPA on file at NDEP with the following parcel numbers:

- MS001 for parcel numbers 06-071-02, 06-071-03, 06-071-05, 06-071-06, 06-022-05,
- MS004 for parcel number 06-063-02, and
- MS030 for parcel number 08-051-20.

As part of the five-year review (FYR), the FYR team sought to determine the status of ICs for the remediated properties. Based on the FYR team's review, it appears that ICs have not been implemented for the remediated properties. Because subsurface soil sampling was not conducted at the same frequency as surface soil sampling during the RI or RA, it is not readily apparent as to whether residual subsurface soil contamination is present or not.

NDEP sent letters to the owners of some of the remediated parcels in Aug 2000, which, in part, stated:

> *"We believe that the removal of contaminated soil and placement of clean fill have eliminated the human health risks associated with mercury-contaminated soil at your property."*

Further, " soils below those excavated were not analyzed or removed, but do not present a (any) current health risk because of the limited potential for direct contact with them, and including recommendations for reburying and/or covering (specifying with two feet of fill in letters to two parcels) and/or soil analysis if the soils below the remediated zone are exposed or otherwise disturbed (one parcel was remediated to one-half foot below grade; the others were remediated to two feet below grade).

The FYR team reviewed the NDEP's list of mercury contaminated properties and example IC letters (see Enclosure 1). After its review, the FYR Team had several IC compliance questions including:

- Did property ***owners*** receive the IC letters from NDEP?
- Do owners of remediated properties follow the IC backfill placement and maintenance requirements?
- Were additional letters of clarification issued?
- It is not clear if all of the parcels remediated are addressed in the previous list or if additional letters were issued, or if any parcels did not receive letters.

## *4. ICs for the Remainder of the Site (Long-Term Sampling and Response Plan)*

The ROD requires the development of the LTSRP to implement institutional controls for the un-remediated portions of the Site.

## LTSRP Development Status

In 2005, EPA provided a draft LTSRP to NDEP. The NDEP provided its comments on the LTSRP in December 2007. The LTSRP has not been finalized. Currently, NDEP and EPA are working with Lyon County to address IC issues for development within the CRMS.

The NDEP described in its 2005 letter to EPA, that the LTSRP will require significant coordination, and possibly some legislation, for its long term application and success. The issues that NDEP identified with that draft version of the plan included:

1. NPL site boundaries. CRMS boundaries have not been defined, and there is no simple method for determining which areas are within or outside of the CRMS.
2. Land use restrictions. There are no land use restrictions on seemingly un-affected properties with clean surface soils (within the top 2 ft); however, unknown, mercury contaminated soils below this depth may present exposure risks.
3. Public education/outreach. Prospective homeowners have no reliable way of knowing whether they are purchasing property on an NPL site, what remedial actions have been taken, or whether any residual contamination may still remain on their property. A close working relationship with local agencies and concerned citizens is necessary to move forward on this issue.
4. Long-term monitoring. Once the initial demonstration of no exceedances of the residential cleanup level is demonstrated, there is no mechanism to ensure that the area has not been recontaminated, either by natural occurrences, such as flood events, or by property owner excavation or regrading.
5. Residential versus industrial cleanup standards. As some areas are being developed as either residential or industrial properties, the LTSRP should also provide an industrial cleanup standard as well as a mechanism for these sites to not be converted to residential use without first going through proper screening.
6. Roles of the NDEP and EPA. The draft LTSRP designated NDEP as the lead on ICs implementation. Importantly; the level of effort necessary to successfully implement the draft LTSRP appears to be much greater than was anticipated and negotiated between NDEP and EPA in its IAG.

## Draft LTSRP Components

The draft LTSRP includes several components including:

**Sampling Options and Remediation Methods**

As required by the ROD, the LTSRP describes sampling and analysis requirements and states that NDEP approval is required for all sampling plans, whether submitted by developers or individual home owners. The section clearly describes the way in which a property owner is to conduct their investigation, sample analysis, and methods for remediation.

**Subdivision Developers**

The draft LTSRP section on subdivision developers states that NDEP would review subdivision maps and "recommend" sampling should all or a portion of the development fall within the CRMS. This section describes actions meeting the ROD ICs requirements (sampling, pre-grading, and confirmation sampling after contaminated soil removal) and also states what steps developers must take to address possible recontamination. This section also states that excavation deeper than 2 ft may be required in areas where there is a greater potential for contact with subsurface soils in the future.

**Durable Notification Mechanism**

Durable notification mechanisms (DNMs) are laid out in this section to provide information to subsequent property owners of the activities and potential residual health risks from the property they have acquired. The section presents DNMs in the following hierarchy from strongest to weakest:

- Deed restrictions,
- Subdivision environmental covenants (ECs) (documents that run with the land),
- Home owner association covenants, conditions, and restrictions (CC&Rs), and
- Long-term Soils Management Plan (LTSMP).

The LTSRP states that any DNM should be "as durable as deed restrictions and as accessible as CC&Rs." This section also describes the ways in which the public can and should be made aware of DNMs for affected properties.

**Sampling Guidelines Based on Levels of Risk**

NDEP has developed the following levels of risk in its sampling decision-making:

- Very low risk (No Sampling Required). Applies to upland properties within the Carson River Watershed where the properties are outside of the floodplain and there are no existing upgradient or adjacent mill sites.
- Low Risk (minimum Sampling Density of two samples per lot). A property is considered low risk if it falls within the general boundaries of the CRMS (designated canyons, alluvial fans, floodplains) but NDEP determines that there are no mills sites or mine wastes present, adjacent to, or immediately upgradient of a property's boundary, and the property falls outside of the Federal Emergency Management Agency (FEMA) 100-year floodplain. Other low risk sites include public lands and non-residential areas.

- Moderate Risk (Higher Sampling Density of four to six samples per lot). Applies to residential development, park, or school lands within the Carson River 100-year floodplain or other active stream channels, and which do not contain mill sites or obvious mining wastes.
- High Risk (Greatest Sampling Density with a minimum of eight samples per lot). Applies to properties proposed for residential development, school, or public park lands which contain evidence of mill sites, mining wastes, or mining affected fluvial drainages.

### Subsequent Property Owners

This section briefly discusses the responsibility that subsequent property owners (after property purchase from the developer) have to address residual risks and what roles NDEP and Lyon County will play in public education. Subsequent property owners will be informed via the DNM process and will also assume responsibility for meeting the requirements of the DNM. NDEP may require sampling of the property by the subsequent property owner according to the sampling requirements of the LTSRP. This section also states that Lyon County will keep a copy of the subdivision sampling records on file and provide informational brochures covering risks, sampling, communication, and remediation.

## NDEP LTSRP Implementation

### Subdivisions

As described in the ROD, NDEP has been implementing the draft LTSRP requirements through the NDEP BWPC permitting process. According to Mr. Jeryl Gardner of the NDEP BCA, the BWPC sends a letter to the developer, copying NDEP BCA, informing them of the requirement to coordinate with BCA on soil sampling for mercury. Upon receiving the letter, BCA sends its own letter to the developer, if the developer hasn't already contacted BCA, describing the coordination process. NDEP keeps track of subdivision development coordination in an electronic spreadsheet. This tracking spreadsheet lists all of the subdivisions since NDEP began this system, their location within the CRMS, their acreages, number of lots, their risk criteria, and sampling decision and outcomes.

According to NDEP, all developers have complied with BWPC permitting requirements, and have voluntarily complied with BCA and the LTSRP

### NDEP and Local Authorities

As a public outreach effort, to educate the local populace without instilling undue fear, the NDEP and Lyon County are working together to develop a brochure that invites the public to inquire about the CRMS. The Lyon County Board of County Commissioners recently approved the brochure (spring 2008), and the Lyon County building permitting office will be providing the brochure to all who seek a building permit from their office. The brochure serves as an informal IC and is not intended as a mechanism to ensure protectiveness. The brochure is included as Attachment 5 to the FYR report.

## *5. Five-Year Review Activities*

This FYR is the second to be conducted for CRMS OU1. The first FYR, completed in September 2003, included a table (Table 3) of NDEP reviewed development proposals. The first FYR also discussed the site visit that looked for new developments in areas which were undeveloped at the time of the ROD. The first FYR identified an IC gap for smaller subdivisions/developments (four housing units or fewer).

With respect to ICs, the second FYR team interviewed and worked with NDEP personnel, interviewed the Lyon County building manager, conducted research at the Lyon County governmental office, and visited a new housing development that went through the process laid out in the draft LTSRP (Including coordination with NDEP to sample, remediate high mercury areas, and implement a DNM).

### NDEP Personnel Interaction

The USACE FYR team interviewed and worked with the NDEP BCA CRMS case personnel, Mr. Jeryl Gardner and Mr. Samuel Jackson. The FYR main report will incorporate all of the information provided by Mr. Gardner and Mr. Jackson in an appendix; this appendix will incorporate the information directly related to ICs. Mr. Gardner and Mr. Jackson provided the USACE FYR team access to their files, shared their site understanding and knowledge, set up the interview with the Lyon County Building Manager with whom they have been partnering to get the brochure released to the public, and guided the site visit.

### Lyon County Building Manager Interview

USACE and NDEP personnel interviewed Lyon County Building Manager, Mr. Nick Malarchik.

NDEP and Lyon County described to USACE that the brochure they are putting before the Lyon County Board of County Commissioners is an attempt to balance all of the competing factors, which make CRMS IC implementation challenging. The design of the brochure and its message was created by NDEP to balance awareness and education without causing undue public alarm. Mr. Malarchik believes the brochure is a good idea and that handing out the brochure through his office when someone comes in for a permit it is the best way to reach potentially affected property owners without unduly raising alarm. The brochure will also be made available on NDEP's and Lyon County's websites. The brochure will be handed out rather than mailed for two reasons (1) the information about risk can be frightening and NDEP and Lyon County do not want to unduly alarm the public; and, (2) the brochure will be given to persons doing property work now; if one brochure was mailed to each address, there is no way to know if the new, future property owner would also receive the information. The brochure is provided to any one who seeks a building permit from Lyon County. At the time of the interview, the board had the vote on the brochure approval on its agenda for its next meeting (the brochure was subsequently approved without revision during the next board meeting).

Mr. Malarchik also mentioned that the permitting process in his office reaches a significant portion of the potentially impacted population given that their permitting requirements apply to the majority of building or excavating property owners do. A permit is required from their office for excavation, such as installation of a swimming pool and building of structures larger than 120 square feet, including car ports and sheds. Mr. Malarchik also said that most excavating is done only within the top two feet or so due to the 18-inch maximum frost penetration depth in the Carson Valley.

Mr. Malarchik expressed his concerns as to what the general public will do with the information in the brochure with respect to who will fund any soil sampling that may need to be conducted. Currently, the property owner is responsible for sampling costs, because it is not federally-funded, nor is there a PRP providing funding for sampling. Mr. Gardner stated that there may be a way, through the LTSRP perhaps, to have a standing contract with a provider so that a member of the public can access an existing contract rather than get their own. The goal of the NDEP contract would be to negotiate a lower bulk price for sampling work required of property owners.

Two other subjects were briefly discussed; the difficulty in determining the CRMS site boundary and the risks from mercury contaminated soils. NDEP answered that there is a risk to people from elemental mercury being absorbed thorough the skin, but the greatest risk was for children under six years old from ingestion of mercury-contaminated soil

Mr. Malarchik expressed concerns that commercial developments should also be subject to sampling and possible remediation. Mr. Gardner answered that most lenders are aware of the CRMS, the LTSRP, and NDEP's involvement with both. In addition, Mr. Gardner stated that most developments require a Phase 1 Environmental Assessment to be conducted that will turn up the CRMS site as an issue to be addressed or else the development will not obtain the necessary financing by the lending institution.

## Title Research

On 4 Mar 2008, the USACE FYR team visited the Lyon County seat in Yerington, NV. The purpose of the visit was to determine (1) what information related to the CRMS was recorded at the County; and, (2) what the process would be for a homeowner or prospective buyer to gather information about a property. The team obtained parcel numbers from the County Assessors Office. The team asked if title information was in their office, but it is not. Deed and title information is obtained through the Recorder's office. Assessor's office personnel took the USACE team to that office where the team was able to use the public computers to check for information. No deed notices or restrictions were found on any of the sample parcel records.

The USACE team searched on the computer for representative properties in the CRMS including new subdivisions, remediated parcels, and former mill site properties. NDEP had provided the team with information about several residential developments (Santa Maria, River Park, and Blue Stone). For those developed properties, the USACE team looked for deed restrictions or notices on titles related to the LTSRP and/or CRMS and looked for recorded ECs, CC&Rs, or technical documents. Any ECs or CC&Rs found were looked through for reference to CRMS work/issues. No technical documents were found, although a recorded placeholder was found for one of the River Park development phases. It turned out that looking up a particular property

(parcel) did not result in the discovery of any development related documents. One had to look under the development name (e.g., Santa Maria) and scroll through the computer pages of recorded documents looking for that name to find any EC or CC&R. Once one of the documents was found, one then had to scroll through pages of information to find if any mention of the CRMS was included. The Lyon County personnel suggested that a title company pulling the information from the county may be able to more easily find the information, but again, the connection with the property may not be made. No recorded ICs were found for the Site.

For the three developments searched, two references to the CRMS were found. One reference was on page 261 of 267 of the "Santa Maria Ranch Development Standards Handbook" for the North Tahoe Investment Group LLC. This reference in Article XII Section 3 provides basic site background information, describes some interaction with NDEP, and summarizes what the property owner should know with, "Buyer should be aware of these conditions and take care should any excavation for swimming pools or other in-ground improvements be undertaken which are more than two feet deep." No guidance, regarding how to "take care" is provided in this document. River Park had an initial and revised ECs recorded. The River Park EC describes in much more detail than the Santa Maria CC&R the work that was conducted at the site and the context for the work and refers the subsequent owner to NDEP for any future excavation work.

Although not required in the ROD, the FYR team also searched for the remediation letters in recorded documents for the remediated parcels. No letters had been recorded. No items had been recorded regarding the cleanup and future land use. One known former mill site property was also checked for any recorded information related to the CRMS. That parcel search did not yield any CRMS information.

Enclosure 2 contains the pertinent pages from the River Park EC and Santa Maria CC&R.

## Site Visit

The portions of the site visit specifically related to ICs were the visit to one recently developed sub-division and changing land use areas in Dayton. The USACE and NDEP team visited the Santa Maria housing subdivision in Dayton. The NDEP team showed the USACE team a former mill site and other locations around the property where the sampling and remediation were successfully employed by the developer through NDEP. The team also drove and looked at the scale of changes in development to areas in and around Dayton; areas that may be subject to ICs under the ROD, but not under the current LTSRP (other mill areas w/ single residences).

Remediated sites were also visited. There is a retaining wall at MS004 to prevent potentially contaminated soils on a hillside from impacting the remediated soils at the base of the slope. The wall does not constitute a fence for a remediated area because it does not prevent the public from accessing the remediated area.

## *6. Conclusions and Recommendations*

This section contains the conclusions made by the USACE team about the ICs and the LTSRP following the site interviews, site visit, and research conducted as part of the second FYR.

- No ICs for the remediated sites have been implemented. ICs or additional sampling may be necessary for these areas. Because neither additional (subsurface) sampling nor implementation of ICs has occurred, the remedy for the remediated areas has not been fully implemented. If ICs are to be implemented, deed restrictions should be executed and recorded for the relevant parcels in the remediated areas. This point will be a significant issue under Section VIII of the FYR report.

- The LTSRP explains the sampling and remediation requirements for unremediated areas outlined in the ROD. A determination as to how or when this document should be finalized needs to be made by EPA, NDEP, and relevant stakeholders. Conversely, a decision to keep it in an evolving state may also be made so long as the process is transparent. The mechanism for the latter would need to be determined.

- The team was able to determine that the portions of the LTSRP that address sampling and remediation at five or more subdivision are in use and functioning as intended in the ROD. The developers are responding to the NDEP and working with them to address the public health risks in OU1 on properties they are developing.

- The only recommendation that the USACE team had for NDEP regarding the tracking of CRMS-related sampling at new developments was to include the sampling and remediation dates on the tracking spreadsheet.

- The durable notification mechanism efforts are not as successful as the sampling and remediation efforts. ECs, CC&Rs, and technical documents are not being recorded at the Lyon County Recorder's Office consistently. The ones that are in the system are not recorded and/or the pertinent information is not presented in a manner in which a member of the general public would easily be able to locate, understand, and use. More efforts are needed in ensuring DNMs are recorded when necessary as per LTSRP requirements, and that the DNMs include information that educates and guides subsequent owners how to take care and when to contact the NDEP. This point will be a significant issue under Section VIII of the FYR report.

- The portions of the LTSRP that address individual property owners or developers subdividing to four or fewer new homes does not currently reach its intended audience in a reliable manner. This audience may hear of contacting NDEP through word-of-mouth or via the Lyon County/NDEP brochure, but currently there is no process in which to catch these property owners like there is for five or more sub-divisions. The brochure is a step in the right direction, but it does not have any enforcement components nor is it a certain line to all those potentially impacted in the CRMS. The brochure may not reach many in the CRMS area because the at-risk public may not conduct work on their property for which a permit is required, not every property owner conducting work on their property will obtain a required permit, and digging, for what ever reason on one's own property, and one may not even know to get a permit. The remedy's protectiveness for this group is evaluated as not protective because there are significant gaps in reaching all potentially impacted parties. The scale of the CRMS makes this effort very challenging, but the level of protectiveness for existing and new developments of four or fewer need to be as effectively reached as the developers. This will be a significant issue in Section VIII of the FYR report.

- The LTSRP uses a likely-risk scale as a guide for soil sampling in lieu of a site boundary map. Not having a site map in which to indicate properties that are clearly not at risk from those which have a high potential for mercury has led the NDEP to be creative in determining the appropriate level of sampling. The USACE team cannot conclude, however, whether having a site map would be more or less helpful than this current system. A map would allow the NDEP to say a property is outside of the area, but there would almost certainly be properties within a very broadly drawn CRMS boundary which do not have any contamination. More work is needed to determine how the map is initially drawn and at the appropriate scale, at what frequency is it updated, and stakeholder input on such a map needs to be obtained.

- Recontamination is also an issue for the remediated sites, as shown at MS004. The adjacent property appeared to have a drive recently regraded. The graded material was pushed close to, if not on some portion of, MS004. The graded soil has the potential to recontaminate MS004. A permit may have been required to do the grading; perhaps this matter could have been addressed via a robust permitting and ICs system.

- NDEP personnel demonstrated that they are passionate for determining how to ensure public health. Mr. Gardner and Mr. Jackson clearly showed how hard they are working to figure out the complex ICs situation despite limited funding. They also expressed their thoughts that the biggest risk to the public is via exposure from the river system that is to be addressed under OU2.

Enclosure 1.  Example IC Letter for Remediated Property

MS001

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

August 1, 2000

Personal Privacy

Subject: Cleanup of Property East of Highway 50 in Dayton, Nevada (Parcel # 06-071-02)

Dear Personal :

From August 1998 to October 1998, the U.S. Environmental Protection Agency (EPA) and its contractors completed a cleanup of mercury-contaminated soil at your property east of Highway 50 and south of Dayton Valley Road in Dayton, Nevada. The cleanup included the excavation of contaminated soil to a depth of two feet, offsite disposal of the soil, replacement of contaminated soil with clean fill, grading and surface contouring to restore the property to pre-cleanup conditions, replacement of an existing fence at the northern property boundary, and revegetation of the excavated area. I am enclosing a drawing showing the cleanup area and final surface contours.

The cleanup was carried out in accordance with the March 1995 EPA Record of Decision for the Carson River Mercury Site, the June 1996 Remedial Design, and the February 1997 plans and specifications. We previously provided a portion of the Remedial Design and copies of drawings showing property boundaries, mercury test results, the area to be excavated, and other details of the cleanup.

This letter notifies you that the cleanup of your property has been completed. We believe that the removal of the contaminated soil and placement of clean fill have eliminated the human health risks associated with mercury-contaminated soil at your property. The cleanup will minimize future exposure to or direct contact with mercury-contaminated soil, particularly by small children.

Soil deeper than two feet was not analyzed or removed, but does not present a current health risk because of the limited potential for direct contact with the deeper soil. If, however, soil in the cleanup area is excavated at depths greater than two feet, we recommend that the excavated soil ultimately be reburied or covered with at least two feet of clean fill. Alternatively, any excavated soil could be analyzed for the presence of mercury by an environmental laboratory and only buried or covered if the mercury concentration exceeds 80 parts per million.

Thank you for your patience and cooperation in carrying out the cleanup. If you have any questions, please contact the EPA Project Manager for the Carson River Mercury Site or staff at the Nevada Division of Environmental Protection's Bureau of Corrective Actions. EPA's toll-

free number is (800) 231-3075; Nevada DEP's main number is (775) 687-4670. The current EPA project manager is Wayne Praskins; the current Nevada DEP contact is Quint Aninao.

Sincerely,

John Kemmerer, Chief
Superfund Site Cleanup Branch

Enclosure

cc: Quint Aninao, Nevada Division of Environmental Protection

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY M8001
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

August 1, 2000

Sbragia Enterprises
P.O. Box 134
Dayton, NV 89403

Subject: Cleanup of Property East of Railroad Street in Dayton, Nevada
(Parcels # 06-071-05 and 06-071-06)

Dear Mr. and Ms. Sbragia:

From August 1998 to October 1998, the U.S. Environmental Protection Agency (EPA) and its contractors carried out a cleanup of mercury-contaminated soil at your property east of Railroad Street and south of Dayton Valley Road in Dayton, Nevada. The cleanup included removal of a large quantity of brush and debris, the excavation of contaminated soil to a depth of two feet, offsite disposal of the soil, replacement of contaminated soil with clean fill, grading and surface contouring to restore the property to pre-cleanup conditions (and provide a level of flood protection similar to that existing at the beginning of the cleanup), replacement of existing fences, and revegetation of the excavated area. I am enclosing a drawing showing the cleanup area and final surface contours.

The cleanup was carried out in accordance with the March 1995 EPA Record of Decision for the Carson River Mercury Site, the June 1996 Remedial Design, and the February 1997 plans and specifications. We previously provided a portion of the Remedial Design and copies of drawings showing property boundaries, mercury test results, the area to be excavated, and other details of the cleanup.

This letter notifies you that the cleanup of your property has been completed. We believe that the removal of the contaminated soil and placement of clean fill have eliminated the human health risks associated with mercury-contaminated soil at your property. The cleanup will minimize future exposure to or direct contact with mercury-contaminated soil, particularly by small children.

Soil deeper than two feet was not analyzed or removed, but does not present a current health risk because of the limited potential for direct contact with the deeper soil. If, however, soil in the cleanup area is excavated at depths greater than two feet, we recommend that the excavated soil ultimately be reburied or covered with at least two feet of clean fill. Alternatively, any excavated soil could be analyzed for the presence of mercury by an environmental laboratory and only buried or covered if the mercury concentration exceeds 80 parts per million.

Thank you for your patience and cooperation in carrying out the cleanup. Later this year,

our archaeological consultants, Archaeological Research Services, will contact you to determine whether you wish to have any or all of the artifacts found on your property returned to you. If you have any questions, please contact the EPA Project Manager for the Carson River Mercury Site or staff at the Nevada Division of Environmental Protection's Bureau of Corrective Actions. EPA's toll-free number is (800) 231-3075; Nevada DEP's main number is (775) 687-4670. The current EPA project manager is Wayne Praskins; the current Nevada DEP contact is Quint Aninao.

Sincerely,

John Kemmerer, Chief
Superfund Site Cleanup Branch

Enclosure

cc: Quint Aninao, Nevada Division of Environmental Protection

MS001

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

August 1, 2000

Personal Privacy

Subject: Cleanup of Property at 120 Railroad Street in Dayton, Nevada (Parcel # 06-071-03)

Dear Personal Privacy:

From August 1998 to October 1998, the U.S. Environmental Protection Agency (EPA) and its contractors carried out a cleanup of mercury-contaminated soil at your property at 120 Railroad Street in Dayton, Nevada. The cleanup included the removal of debris; excavation of contaminated soil to a depth of two feet (except in one area where mercury concentrations from one to two feet deep did not exceed EPA's 80 part per million cleanup goal, and soil was excavated to a depth of one foot); offsite disposal of the soil; replacement of contaminated soil with clean fill; grading and surface contouring to restore the property to pre-cleanup conditions (and provide a level of flood protection similar to that existing at the beginning of the cleanup); replacement of fencing; replacement of lawn and two trees removed during the cleanup; and reseeding of non-landscaped areas with a sagebrush-free seed mix. I am enclosing a drawing showing the cleanup area and final surface contours.

The cleanup was carried out in accordance with the March 1995 EPA Record of Decision for the Carson River Mercury Site, the June 1996 Remedial Design, and the February 1997 plans and specifications. We previously provided a portion of the Remedial Design and copies of drawings showing property boundaries, mercury test results, the area to be excavated, and other details of the cleanup.

This letter notifies you that the cleanup of your property has been completed. We believe that the removal of the contaminated soil and placement of clean fill have eliminated the human health risks associated with mercury-contaminated soil at your property. The cleanup will minimize future exposure to or direct contact with mercury-contaminated soil, particularly by small children.

Soil deeper than two feet was not analyzed or removed, but does not present a current health risk because of the limited potential for direct contact with the deeper soil. If, however, soil in the cleanup area is excavated at depths greater than two feet, we recommend that the excavated soil ultimately be reburied or covered. Alternatively, any excavated soil could be analyzed for the presence of mercury by an environmental laboratory and only buried or covered if the mercury concentration exceeds 80 parts per million.

Thank you for your patience and cooperation in carrying out the cleanup. If you have any questions, please contact the EPA Project Manager for the Carson River Mercury Site or staff at the Nevada Division of Environmental Protection's Bureau of Corrective Actions. EPA's toll-free number is (800) 231-3075; Nevada DEP's main number is (775) 687-4670. The current EPA project manager is Wayne Praskins; the current Nevada DEP contact is Quint Aninao.

Sincerely,

John Kemmerer, Chief
Superfund Site Cleanup Branch

Enclosure

cc: Quint Aninao, Nevada Division of Environmental Protection

MSD01

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

August 1, 2000

Personal Privacy

Subject: Cleanup of Property West of Railroad Street in Dayton, Nevada
(Parcel # 06-022-05)

Dear Personal Privacy:

From September 1998 to October 1998, the U.S. Environmental Protection Agency (EPA) and its contractors carried out a cleanup of mercury-contaminated soil at your property west of Highway 50 and just north of the Dayton Post Office in Dayton, Nevada. The cleanup included the temporary relocation of mobile home no. 1 and its tenants, excavation of contaminated soil to a depth of one-half foot beneath and around mobile home #1, excavation of contaminated soil to a depth of one foot next to mobile home #2, offsite disposal of the soil, replacement of contaminated soil with clean fill, return of the trailer to its original location and reconnection of the utilities in accordance with Lyon County requirements, inspection by Lyon County officials, replacement of a small area of sod, and placement of compacted gravel. During the cleanup, EPA arranged for the displaced family to stay at a hotel in Carson City and provided payments for meals and certain expenses. Approximately 36 cubic yards of mercury-contaminated soil were transported off-site for disposal.

The cleanup was carried out in accordance with the March 1995 EPA Record of Decision for the Carson River Mercury Site, the June 1996 Remedial Design, and the February 1997 plans and specifications. We previously provided a portion of the Remedial Design and copies of several drawings showing property boundaries, mercury test results, the area to be excavated, and other details of the cleanup.

This letter notifies you that the cleanup of your property has been completed. We believe that the removal of the contaminated soil and placement of clean fill have eliminated the human health risks associated with mercury-contaminated soil at your property. The cleanup will mininize future exposure to or direct contact with mercury-contaminated soil, particularly by small children.

Soils below those excavated were not analyzed or removed, but do not present any current health risk because of the limited potential for direct contact with the deeper soils. If, however, soil in the cleanup area is excavated at depths greater than one-half foot (beneath or around mobile home #1) or one foot (next to mobile home #2 ), we recommend that the excavated soil ultimately be reburied or covered with at least six inches of compacted road mix

gravel. Alternatively, any excavated soil could be analyzed for the presence of mercury by an environmental laboratory and only buried or covered if the mercury concentration exceeds 80 parts per million.

Thank you for your patience and cooperation in carrying out the cleanup. If you have any questions, please contact the EPA Project Manager for the Carson River Mercury Site or staff at the Nevada Division of Environmental Protection's Bureau of Corrective Actions. EPA's toll-free number is (800) 231-3075; Nevada DEP's main number is (775) 687-4670. The current EPA project manager is Wayne Praskins; the current Nevada DEP contact is Quint Aninao.

Sincerely,

John Kemmerer, Chief
Superfund Site Cleanup Branch

Enclosure

cc: Quint Aninao, Nevada Division of Environmental Protection

MSD004

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

August 1, 2000

Personal Privacy

Subject: Cleanup of Property at 150 Douglas Street in Dayton, Nevada
(Parcel #06-063-02)

Dear Personal :

In October 1999, the U.S. Environmental Protection Agency (EPA) and its contractors carried out a cleanup of mercury-contaminated soil at the property at 150 Douglas Street in Dayton, Nevada. The cleanup included demolition of an existing carport, removal and disposal of tires and debris, excavation of a drainage swale, placement of six inches of clean soil on the property, excavation of a limited amount of contaminated soil along the northern edge of the property to provide a smooth transition from the existing to final grade, and placement and compaction of "road mix" gravel. We made the decision to place clean fill and not excavate soil from the majority of the property in consultation with you last year, in keeping with your plans to bring in additional fill and redevelop the property. I am enclosing a drawing showing the location of the cleanup area.

The cleanup was carried out in accordance with the March 1995 EPA Record of Decision for the Carson River Mercury Site, the June 1996 Remedial Design, and the February 1997 plans and specifications. We previously provided a portion of the Remedial Design and copies of several drawings showing property boundaries, mercury test results, the area to be excavated, and other details of the cleanup.

This letter notifies you that the cleanup of the property has been completed. We believe that the placement of clean fill has eliminated the human health risks associated with mercury-contaminated soil at the property. The cleanup will minimize future exposure to or direct contact with mercury-contaminated soil, particularly by small children.

Soil beneath the clean fill contains elevated levels of mercury, but does not present a current health risk because of the limited potential for direct contact with the deeper soil. If, in the future, soil in the cleanup area is excavated at depths greater than one-half foot below the current grade, we recommend that the excavated soil ultimately be reburied or covered with at least six inches of compacted road mix gravel, or two feet of clean fill.

Thank you for your patience and cooperation in carrying out the cleanup. If you have

any questions, please contact the EPA Project Manager for the Carson River Mercury Site or staff at the Nevada Division of Environmental Protection's Bureau of Corrective Actions. EPA's toll-free number is (800) 231-3075; Nevada DEP's main number is (775) 687-4670. The current EPA project manager is Wayne Praskins; the current Nevada DEP contact is Quint Aninao.

Sincerely,

John Kemmerer, Chief
Superfund Site Cleanup Branch

Enclosure

cc: Quint Aninao, Nevada Division of Environmental Protection

MS030

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

August 1, 2000

Personal Privacy

Personal Privacy

Subject: Cleanup of Property in Silver City, Nevada (Parcel # 08-051-20)

Dear Mr. Personal Privacy

From August 1998 to November 1998, the U.S. Environmental Protection Agency (EPA) and its contractors carried out a cleanup of mercury-contaminated mill tailings at your property in Silver City, Nevada. The cleanup included the excavation of contaminated tailings and soil, offsite disposal of the contaminated materials, and revegetation of the excavated area. I am enclosing a drawing showing the cleanup area and final surface elevation. Approximately 810 cubic yards of mercury-contaminated tailings and soil were transported off-site for disposal. Based on the results of twelve samples collected from soil exposed after excavation was completed and analyzed for the presence of mercury, we believe that we were successful in excavating all of the mercury-contaminated soil and tailings in the designated cleanup area exceeding EPA's 80 part per million cleanup goal. Accordingly, we did not exercise the option of placing any clean fill over the excavated area. The enclosed table summarizes the analytical results.

The cleanup was carried out in accordance with the March 1995 EPA Record of Decision for the Carson River Mercury Site, the June 1996 Remedial Design, and the February 1997 plans and specifications. We previously provided a portion of the Remedial Design and copies of several drawings showing property boundaries, mercury test results, the area to be excavated, and other details of the cleanup.

This letter notifies you that the cleanup of your property has been completed. We believe that the removal of the contaminated tailings and placement of clean fill have eliminated the human health risks associated with mercury-contaminated soil at your property. The cleanup will minimize future exposure to or direct contact with mercury-contaminated soil, particularly by small children.

Thank you for your patience and cooperation in carrying out the cleanup. If you have any

questions, please contact the EPA Project Manager for the Carson River Mercury Site or staff at the Nevada Division of Environmental Protection's Bureau of Corrective Actions. EPA's toll-free number is (800) 231-3075; Nevada DEP's main number is (775) 687-4670. The current EPA project manager is Wayne Praskins; the current Nevada DEP contact is Quint Aninao.

Sincerely,

John Kemmerer, Chief
Superfund Site Cleanup Branch

cc: Quint Aninao, Nevada Division of Environmental Protection

Enclosure 2. Excerpts from River Park Environmental Covenant and Santa Maria Covenants, Conditions & Restrictions Pertaining to CRMS

Mirror
Book 0393191

DOC # 399104
01/19/2007 08:58 AM
Official Record
Requested By
RESOURCE CONCEPTS INC
Lyon County - NV
Mary C. Milligan - Recorder
Page 1 of 7 Fee: $45.00
Recorded By: JAK RPTT:

0399104

APN#_____

**Recording Requested by:**

Name: Resource Concepts, Inc.

Address: 340 N. Minnesota St.

City/State/Zip: Carson City, NV 89703

**Mail Tax Statements to:**

Name: _____

Address: _____

City/State/Zip: _____

Park. River Park

Environmental Covenant revised
**Title of Document**

**Complete All That Apply:**

**The Undersigned Hereby Affirms That This Document Submitted For Recording Contains A Social Security Number As Required By Law:**

_____ _____
Specify Law* Signature

_____ _____
Specify Law* Print Name Title

*If there is no applicable State or Federal Law, Social Security Number must be removed prior to recording.

**This document is being recorded to accomplish:**

Correcting Document#: _____ Amending:_____

Other:_____
(For Re-records, all pages from original document must be included, $25 Non-conforming Fee Applies)

**Legal description is a metes & bounds description and was obtained from:**

_____( Document Title), Book ____ Page _____ or

Document #_____ recorded _____(date) in the

Lyon County Recorder's Office.

**-OR-**

If prepared by a surveyor, provide name and address:

_____

_____

*********

This page added to provide additional information required by NRS 111.312 Sections 1-4.
($1.00 Additional Recording Fee Applies)
*This document is available on our website:www.lyon-county.org Recorder Department, Forms*

**ENVIRONMENTAL COVENANT**

LENNAR RENO, LLC, (hereafter "Grantor") this 12th day of May, 2006, grant this Environmental Covenant (hereafter "Covenant") to the State of Nevada, Department of Conservation and Natural Resources, Division of Environmental Protection (hereafter "NDEP").

WHEREAS, Grantor is the record owner of certain property commonly referred to as the Riverpark Subdivision, located in Dayton, Nevada, and more particularly described in Exhibit "A", attached hereto and incorporated herein by reference (hereafter "the Property"); and

WHEREAS, the Property is the subject of enforcement and remedial action pursuant to the Nevada Revised Statutes, Title 40, (hereafter "Uniform Environmental Covenants Act") and the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§ 9601, et seq. (hereafter "CERCLA") ; and

WHEREAS, the purpose of this Covenant is to ensure protection of human health and the environment by notifying the public that the Property is located within the Carson River Mercury Site. Mining activities in the mid 1800's resulted in the discharge of mercury into the Six Mile Canyon drainage and the Carson River. Residual mercury was identified within these drainages, and in August 1990, the Carson River Basin and the Carson Sink were placed on the United States Environmental Protection Agency's (hereafter "EPA") National Priority List under CERCLA; and

WHEREAS, after numerous studies, the EPA established a health-based exposure limit for residential areas within the Carson River Mercury Site of 80mg/Kg total mercury in soil and 300 mg/Kg of total mercury in soils for non-residential areas; and

WHEREAS, concentrated sampling on a parcel-by-parcel basis was conducted for statistical evaluation of the potential for mercury on the Property. Sampling was confined to the top two (2) feet of soil, as required by the NDEP. Sample results from each parcel, and a detailed and extensive report is on file and available for review at the NDEP, and on record with the Lyon County Recorder's Office, Doc. No. , Dated ; and

WHEREAS, Grantor desires to subject the Property to certain covenants and restrictions as provided in the Uniform Environmental Covenants Act, which covenants and restrictions shall burden the Property and bind Grantor and all parties having any right, title or interest in the Property, or any part thereof, their heirs, successors and assigns, and any persons using the land, as described herein, for the benefit of the NDEP.

NOW THEREFORE, Grantor hereby grants this Environmental Covenant to the NDEP and declare that the Property as described in Exhibit "A" shall hereinafter be bound by, held, sold, and conveyed subject to the following requirements set forth in paragraphs 1 through 8, below, which shall run with the Property in perpetuity and be

binding on Grantor and all parties having any right, title or interest in the Property, or any part thereof, their heirs, successors and assigns, and any persons using the land, as described herein. As used in this Covenant, the term "Owner" means the record owner of the Property and, if any, any other person or entity otherwise legally authorized to make decisions regarding the transfer of the Property or placement of encumbrances on the Property, other than by the exercise of eminent domain.

1) Modifications: This Covenant runs with the land and is perpetual, unless modified or terminated pursuant to this paragraph or the Uniform Environmental Covenants Act. Owner may request that the NDEP approve a modification or termination of the Covenant. The request shall contain information showing that the proposed modification or termination shall, if implemented, ensure protection of human health and the environment. The NDEP shall review any submitted information, and may request additional information. If the NDEP determines that the proposal to modify or terminate the Covenant will ensure protection of human health and the environment, it shall approve the proposal. No modification or termination of this Covenant shall be effective unless the NDEP has approved such modification or termination in writing. Information to support a request for modification or termination may include one or more of the following:

   a. a proposal to perform additional remedial work;

   b. new information regarding the risks posed by the residual contamination;

   c. information demonstrating that residual contamination has diminished;

   d. information demonstrating that the proposed modification would not adversely impact the remedy and is protective of human health and the environment; and

   e. other appropriate supporting information.

2) Notice to Lessees: Owner agrees to incorporate either in full or by reference the restrictions in this Covenant in any leases, licenses, or other instruments granting a right to use the Property.

3) Notification for proposed construction and land use: Soil sampling has only been done and approved by NDEP at a depth of two (2) feet. Prior to engaging in any grading, digging, construction, and/or building at a depth below two (2) feet, Owner shall obtain a soils management plan approval from NDEP.

4) Inspections: The NDEP shall have the right of entry to the Property at reasonable times with prior notice for the purpose of determining compliance with the terms of this Covenant. Nothing in this Covenant shall impair any other authority the NDEP may otherwise have to enter and inspect the Property.

5) No Liability: The NDEP does not acquire any liability under Nevada law by virtue of accepting this Covenant.

6) Enforcement: The NDEP may enforce the terms of this Covenant pursuant to Uniform Environmental Covenants Act. Included in the statutory rights and remedies afforded to NDEP, is the ability to file suit in district court to enjoin actual or threatened violations of this Covenant.

7) Notices: Any document or communication required under this Covenant shall be sent or directed to:

State of Nevada
Division of Environmental Protection
Bureau of Corrective Actions
901 South Stewart Street, Suite 4001
Carson City, Nevada 89701-5249

Grantor has caused this instrument to be executed this day of May, 2006

LENNAR RENO, LLC

By _____ as Vice President

STATE OF Nevada )
)
COUNTY OF Washoe )

The foregoing instrument was acknowledged before me this 4th day of May, 2006, by David Siler on behalf of LENNAR RENO, LLC.

Diane L. Disney
Notary Public

DIANE L. DISNEY
Notary Public - State of Nevada
Appointment Recorded in Washoe County
No: 94-3841-2 - Expires July 26, 2008

10345 Professional Circle
Address
Reno, NV 89521

My commission expires: July 26, 2008

ACCEPTED BY the Nevada Division of Environmental Protection this 12th day of May, 2006

By: Leo M Drozdoff

Title: Administrator

STATE OF Nevada )
)
COUNTY OF Carson )

The foregoing instrument was acknowledged before me this 12th day of May, 2006, by Leo M. Drozdoff on behalf of the Nevada Division of Environmental Protection.

Karen Howard
Notary Public

KAREN HOWARD
Notary Public - State of Nevada
Appointment Recorded in County of Carson City
My Appointment Expires March 24, 2009
05-95780-3

901 S. Stewart St.
Address

Carson City, NV 89701

My commission expires: 3/24/09

**CONSENT**

GMAC Model Home Finance, LLC, a Delaware limited liability company and successor by statutory conversion to GMAC Model Home Finance, Inc., a Virginia corporation, hereby joins in the execution of the attached Environmental Covenant executed as of May 12, 2006 by Lennar Reno, LLC, for the purpose of acknowledging that GMAC Model Home Finance, LLC hereby consents to the Environmental Covenant and to the recordation of the Environmental Covenant against properties owned in the River Park Subdivision which are owned by GMAC Model Home Finance, LLC.

GMAC Model Home Finance, LLC, a Delaware limited liability company and successor by statutory conversion to GMAC Model Home Finance, Inc., a Virginia corporation

By _____
Its: Vice President

State of Virginia )
) ss
County of Henrico )

The foregoing instrument was acknowledged before me this 4 day of January, 2007 by Mark P. Paniccia on behalf of GMAC Model Home Finance, LLC.

Sarah P Berglund
Notary Public Sarah P. Berglund

My commission expires: 10/31/08

RECEIVED
JAN 11 2007

## ARTICLE XII
## MISCELLANEOUS GENERAL PROVISIONS

**Section 1. Enforcement.**

Except as expressly limited herein, Association, Declarant and any Owner shall have the right to enforce the provisions of this Declaration now or hereafter imposed by arbitration as prescribed by Nevada Revised Statutes 38.300-360, or by any proceeding at law or in equity. Failure by the Association, Declarant or by any Owner to enforce any provision shall in no event be deemed a waiver of the right to do so thereafter. The Association may establish and impose administrative procedures for resolving claims or disputes arising from the interpretation, application or enforcement of any provisions stated herein or specified in the Articles, Bylaws or rules and regulations adopted by the Association or the Committee.

**Section 2. Suspension of Privileges.**

The Board may, anything herein to the contrary notwithstanding, suspend all voting rights, other membership rights and all rights to use the Association's Common Areas of any Owner for any period during which any continuing violation of the provisions of this Declaration by such Owner after the existence thereof has been declared by the Board, including a violation by virtue of the failure of a member to comply with the rules and regulations of the Association. The foregoing notwithstanding, during any period in which assessments of any kind on an Owner's Unit are delinquent, all voting rights, other membership rights, and all rights to use the Association's Common Areas shall be suspended.

**Section 3. Carson River Mercury Site.**

Some of the lots located within Santa Maria Ranch are located within the Carson River Mercury Site, which encompasses a 100-mile stretch of the Carson River beginning near Carson City, Nevada, and extending downstream, through the Lahontan Reservoir. Buyer is referred to the following documents which provide additional information regarding this issue, which are available from the Association: (a) the letter to North Tahoe Investment Group, LLC, from the Division of Environmental Protection, Department of Conservation and Natural Resources of the State of Nevada, dated March 1, 2004; (b) the letter to North Tahoe Investment Group, LLC from Western Engineering & Surveying Services, dated February 27, 2004; (c) the Phase One Environmental Site Assessment by Kleinfelder (engineers) dated December 10, 2002; and, (d) the report of Converse Consultants to Dale Denio and North Tahoe Investment Group, LLC dated February 29, 2004; (e) the Soils Sampling Report of Pezonella Associates, Inc. dated March 28, 2003, and (f) the letter dated March ___, 2005 from the Nevada Department of Environmental Protection, all of which report upon these conditions. Buyer should be aware of these conditions and take care should any excavation for swimming pools or other in-ground improvements be undertaken which are more than two feet deep.

**Section 4. Severability.**

Invalidation of any one of these covenants, conditions or restrictions by judgment or court order shall in no way affect any other provisions, which shall remain in full force and effect.

**Section 5. Amendment.**

# Attachment 7

*Ecological Risk Assessment Memorandum [RESERVED]*

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# Attachment 8

*Advertisement for Notice of Five-Year Review [RESERVED]*

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